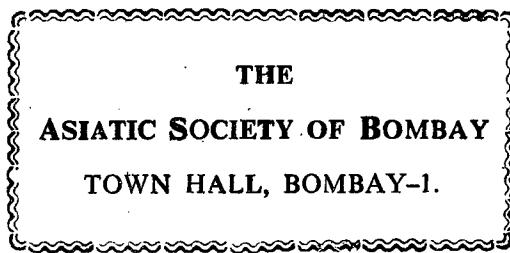


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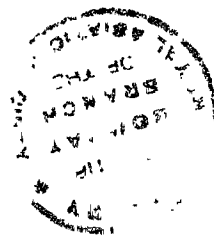
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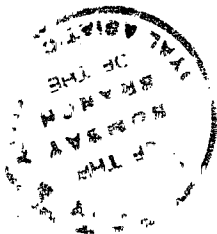
CORRIGENDA.

- On page 141, in line 12 *for* the figure "1,95,000" *read* "1,25,000."
- " 609 " 10 *omit* the word "wet."
- " 637 " 21 *transfer* the words "a haphazard" to line 15 after the word "in."
- " 747 " 52 *for* the words "a requirement of railways" *read* "railway waggons."

G. H. W. DAVIES,

Secretary, Indian Industrial Commission.

N.B.—Trivial errors which do not obscure the sense are not included in this slip.



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QUESTIONS FOR THE ASSISTANCE OF WITNESSES.

I.—FINANCIAL AID TO INDUSTRIAL ENTERPRISES.

1. Please state if you have had any experience of the raising of capital for industrial enterprises?

If so, what difficulties have you found in doing so?

What suggestions have you to make for removing these difficulties?

2. What are the sources from which capital for industrial enterprises is principally drawn?

2 (a). Can you suggest any new sources from which capital may be drawn?

3. Do you know of any kinds of industrial enterprises where more concerns have been started than can be maintained in full time employment?

If so, please describe the general conditions.

4. What is your knowledge or experience of financial aid by Government to industrial enterprises? Government assistance.

5. What are your opinions on the following methods of giving Government aid to existing or new industries:—

(1) money grants-in-aid;

(2) bounties and subsidies;

(3) guaranteed dividends for a limited period, with or without subsequent refund to Government of the expenditure incurred in paying dividends at the guaranteed rate;

(4) loans, with or without interest;

(5) supply of machinery and plant on the hire-purchase system;

(6) provision of part of share capital of companies on the same basis as public subscriptions of capital;

(7) guaranteed or preferential Government purchase of products for limited periods and

(8) exemption for a limited period of the profits of new undertakings from income-tax; and exemption from any tax on an industry, or on any article used in an industry?

6. In which methods of Government assistance should there be Government control or supervision?

What should be the form of such control or supervision? (*E.g.*, Government audit or appointment of Government directors with defined powers for the period during which direct assistance lasts.)

7. What is your experience or opinion of Government pioneer factories?

Pioneer factories.

[NOTE.—By pioneer factories are meant those established primarily to ascertain whether a new industry is commercially practicable?

By demonstration factories (see Questions 19 and 20) are meant those established primarily for giving demonstrations of, and instruction in, improved methods for industries which have been proved to be commercially practicable.]

8. In what ways and to what extent should Government pioneer industries?

At what stage should pioneer factories be either closed or handed over to private capitalists or companies?

What limits and restrictions, if any, should be imposed on the conversion of successful pioneering experiments into permanent Government enterprises?

9. In your experience what industries are hampered by the conditions under which they are financed as going concerns? Financing agencies.

Please describe the method of financing and its effect on the industry in each case.

10. In what ways is it possible to give more assistance to industrial undertakings by existing or new banking agencies?

10 (a). Do you think there is need of a banking law?

[See also question 39.]

11. Do you know of any industries which have been developed or assisted by the formation of co-operative societies? Co-operative societies.

What were the exact means adopted and what were the results obtained?

12. In your experience what are the industries for which co-operative societies should be encouraged?

What should be the organisation and special objects of these Societies?

12 (a). What suggestions have you to make for industrial development by means of Trade Guilds, such as exist in other countries?

How far should the State encourage the promotion of such Guilds?

s of Govern-
assistance.

13. What principles should be followed in order to prevent Government aid competing with existing, or discouraging fresh, private enterprises.

14. Should there be any limitations on Government aid to a new enterprise if it competes with an established external trade?

II.—TECHNICAL AID TO INDUSTRIES.

ical aid in
d.

15. What is your personal knowledge or experience of technical and scientific aid provided by Government to industrial enterprise?

16. What is your personal knowledge or experience of noticeable benefits received by local industries from researches conducted by Government departments?

17. On what conditions should the loan of Government experts be made to private firms or companies?

onstration
ries.

18. Under what restrictions and conditions would you allow publication of the results of researches made by a Government paid expert while attached to a private business?

19. Can you suggest any industry for which Government demonstration factories should be adopted and on what lines? (See note below Question 7.)

20. Should any demonstration factories be instituted in your province?

arch abroad.

21. What has been your experience of the aid afforded by the Scientific and Technical Department of the Imperial Institute?

What are its advantages and disadvantages?

22. In addition to arrangements made for research in India, is it advantageous to have provision for research for special subjects in the United Kingdom?

If so, for what special purposes is it advantageous to conduct researches in England rather than in India?

23. In what ways can the Advisory Council for Research in the United Kingdom give assistance to Indian industries?

24. Can you suggest for this country any system, similar to that of the Advisory Council for Research in the United Kingdom, for referring research problems to Colleges and other appropriate institutions in India? (See Questions 75 and 76.)

veys for
ustrial purposes.

25. Does the existing knowledge of the available resources of the country—agricultural, forest, mineral, etc.—require to be supplemented by further surveys?

26. How should such a survey be organised?

What should be its precise objects?

27. How should its results be made most useful to industries?

27 (a). What is your experience or opinion of the value of Consulting Engineers appointed by Government to aid industrial enterprise by technical advice and by the supply of plans and estimates?

(b) Should such Consulting Engineers be allowed to undertake the purchase of machinery and plant for private firms or individuals? If so, under what conditions?

[See Question 63 *et seq.*]

III.—ASSISTANCE IN MARKETING PRODUCTS.

mmercial
seums.

28. What is your experience or opinion of commercial museums, *e.g.*, that in Calcutta?

29. If you think commercial museums should be developed and increased in number, what suggestions have you to make regarding their situation, arrangement and working?

les agencies.

30. What is your experience or opinion of sales agencies or commercial emporia for the sale as well as the display of the products of minor and unorganised cottage industries.

How should they be developed?

hibitions.

30 (a) Would travelling exhibitions of such industries be of advantage?

31. What is your opinion or experience of the value of industrial exhibitions?

32. Should Government take measures to hold or to encourage such exhibitions?

If so what should be the Government policy?

33. What should be the nature of such exhibitions?

Should they be popular in character, or should they aim merely at bringing sellers and buyers into contact?

34. Should trade representatives be appointed to represent the whole of India, in Great Britain, the Colonies and Foreign Countries? Trade representatives.

What should be the qualifications of these trade representatives?

How should their duties be defined?

35. In addition to these trade representatives would it be suitable in some cases also to have temporary Commissions for special enquiries?

36. Should provinces in India itself have trade representatives in other provinces?

How should such representation be arranged for?

37. Should the principal Government departments which use imported articles publish lists of these articles, or exhibit them in commercial museums? Government patronage.

38. With reference to the encouragement of Indian industries, have you any criticisms to offer regarding the working of the present rules relating to the purchase of stores by Government departments?

Have you any changes to propose in the rules themselves?

39. In what way is it possible to assist in marketing indigenous products by more banking facilities, either through existing agencies (such as the Presidency Exchange, Joint Stock and Co-operative Credit Bank) or through new agencies (such as Industrial and Hypothec Banks)? (see also Question 10.) Banking facilities.

IV.—OTHER FORMS OF GOVERNMENT AID TO INDUSTRIES.

40. What conditions should control the supply of Government-owned raw materials (e.g. forest products) on favourable terms? Supply of raw materials.

41. Is there any check at present imposed on industrial development in your province by the land policy of Government?

If so, what remedies do you suggest?

(NOTE.—The expression "land policy" is intended to cover laws and regulations relating to settlements, the Government assessment, rents, tenant rights, permission to use land for industrial purposes, and generally all matters connected with the ownership and use of land.)

42. On what principles should Government give concessions of land for the establishment of new, or the development of existing, industries?

43. What criticisms have you to make regarding the working of the present law for the acquisition of land on behalf of industrial companies?

What modifications of the law do you recommend?

43. (a) In what ways and on what terms can Government assist in the provision of subterranean or surplus surface water for industrial purposes.

V.—TRAINING OF LABOUR AND SUPERVISION.

44. (a) Do you think that the lack of primary education hinders industrial development? General.

(b) What has been done in any industry of which you have had experience to improve the labourers' efficiency and skill?

45. What steps do you consider should be adopted to improve the labourers' efficiency and skill—

(a) generally, and

(b) in any industry of which you have had experience?

46. What special knowledge or experience have you of the training of apprentices in factories and workshops? Apprenticeship system and industrial schools.

47. What advantages have you observed to follow from the establishment of industrial schools?

48. On what lines should these two systems of training (e.g., apprenticeship system and industrial schools) be developed and co-ordinated?

49. What has been your experience of day schools for short-time employees, or of night schools?

How should these be developed?

50. Should industrial and technical schools and commercial colleges be under the control of the Department of Education or of a Department of Industries?

What measures should be adopted in order that these two departments should work in unison in controlling industrial schools?

51. What measures are necessary for the training and improvement of supervisors of all grades and of skilled managers? Training of supervising and technical staff.

52. What assistance should be given to supervisors, managers and technical experts of private firms to study conditions and methods in other countries? (See Question 77.)

53. In what circumstances and under what conditions should industries assisted by Government be required to train technical experts?

ical
rs.

54. Is there a want of uniformity in the standard of examinations for mechanical engineers held in the various provinces where engineers in charge of prime movers are required in certain cases to be certificated?

If so, should measures be adopted to make such tests uniform so that the Local Governments and Administrations may reciprocate by recognising each other's certificates?

55. If the law in your province does not require any qualifications in an engineer in charge of a prime mover, have you any criticisms or suggestions to make?

VI.—GENERAL OFFICIAL ADMINISTRATION AND ORGANISATION.

56. What provincial organisation exists in your province for the development of industries?

What criticism have you to make regarding its constitution and functions?

57. What organisations do you recommend for the future development of industries in your province?

Should there be a Board of Industries?

If so, what should be the functions of such a Board?

Should it be merely advisory or should it have executive powers with budgetted funds?

58. If you recommend an Advisory Board, how should it be constituted?

59. If you recommend a Board with powers, what should be its constitution and how should its powers be defined?

60. Should there be a Director of Industries?

What should be his functions?

Should he be a business man, or a non-expert official, or a technical specialist?

What other qualifications should he possess?

61. If you recommend both the formation of a Board of Industries and the appointment of a Director of Industries, what should be the relations between the Board of Industries, the Director of Industries and the Provincial Government or Administration?

62. What form of machinery do you propose in order to correlate the separate activities of the various provinces as regards industries?

Is it practicable to form an Imperial department under a single head?

If so, what should be the functions of such a department?

e industries.

62 (a). Should there be special measures taken or special sections of a Department of Industries organised for the assistance of cottage industries?

62 (b). Please explain in detail what should be the Government policy as regards cottage industries and how it should be carried into effect? In this connection, see especially Questions 11, 30, 64 and 72.

62 (c). What cottage industries do you recommend should be encouraged in this way?

VII.—ORGANISATION OF TECHNICAL AND SCIENTIFIC DEPARTMENTS OF GOVERNMENT.

l. o

63. Are there in your province any technical and scientific departments which are capable of giving assistance to industries?

If so, what criticisms have you to make regarding their organisation?

What changes do you recommend?

al depart-

64. In order to aid industrial development do you recommend the formation of any new Imperial Scientific and Technical Departments?

If so, for what subjects or natural groups of subjects?

65. How should such an Imperial department be constituted and recruited?

66. What should be the powers of the head of the department?

If he has executive control of the department, what should be his relationship to the Imperial Government?

67. What should be the relationship of an expert, whose services are loaned by the Imperial department to a Local Government, with the Local Government and the latter's Department of Industries?

ncial Depart-

68. For what subjects should Local Governments engage their own experts or organise their own technical and scientific departments?

69. Under what direct control should these experts and departments be placed?

70. On what terms should these experts be employed?

hnological insti-
ons.

71. What is the most suitable way of developing technological research institutions, such as the Indian Institute of Science?

71 (a). Should there be a Technological Institute for each province, and should such Institutes be allowed to develop as independent units or should they be fitted into a general development scheme for the whole of India, with a central Research Institute?

72. As regards investigation and research should each Institute be general in its activities and interests, or should each deal with limited group of related subjects ?

73. Should there be any Government control ?

If so, should this control be Imperial or should it be purely provincial or local ?

74. Is it desirable that measures should be taken to co-ordinate and prevent unnecessary Co-ordination overlapping of the research activities in Government Technical and Scientific Departments, research. special Technological Institutes and University Colleges ?

If so, what are your suggestions ?

75. What noticeable results have followed from the institution of the Indian Science Congress ?

76. Can you suggest any ways in which the Congress might become more useful in assisting industrial development ? (See Question 24.)

77. What encouragement should be given to Government technical and scientific experts Study of foreign methods. to study conditions and methods in other countries ? (See Question 52.)

78. What difficulties have you experienced in consulting technical and scientific works Reference libraries of reference ?

79. Have you any suggestions to make regarding the establishment of libraries of such works ?

80. Do you think that the establishment of a College of Commerce is necessary in your Colleges of commerce. province ?

If so, on what lines should it be organised ?

81. In what ways do you expect such a college to assist industrial development ?

81 (a). In what ways can Municipalities and Local Boards assist in promoting industrial and commercial development ?

VIII.—GOVERNMENT ORGANISATION FOR THE COLLECTION AND DISTRIBUTION OF COMMERCIAL INTELLIGENCE.

82. Have you any criticisms to offer on the present system of collecting and distributing Statistics. statistics by the Director of Statistics ?

What changes do you suggest ?

83. Have you any criticism to offer on the present system of collecting and distributing Commercial intelligence. commercial intelligence by the Director-General of Commercial Intelligence ?

What modifications do you suggest ?

84. What advantages have you found in the issue of the " Indian Trade Journal ? " Industrial and trade journals.

85. Should Government establish or assist industrial or trade journals, either for general or special industries, which would be of real use to persons actively engaged in industries ?

86. What proposals do you make for the dissemination of information of this kind through the various vernaculars ?

87. What advantages have you known to follow the issue of special monographs on Other publications. industrial subjects or publications like those of the Forest and Geological Departments ?

What measures do you advise in order to increase the usefulness of these publications ?

88. Are there any other directions in which Government could collect and publish information of a kind likely to assist industries and trades ?

IX.—OTHER FORMS OF GOVERNMENT ACTION AND ORGANISATION.

89. Are there any products for which a system of Government certificates of quality Certificates of quality. should be established ?

For what products should such certificates be compulsory, and for what products voluntary ?

90. What should be the organisation for testing each class of products and granting certificates ?

91. Are there any classes of materials for manufacture or of manufactured articles for the Prevention of adulteration. adulteration of which penalties should be imposed ?

92. For each such class of goods what organisation do you suggest for purposes of inspection and prosecution of offenders ?

93. Have any other suggestions to make in regard to the prevention of misdescription Misdescription. of goods generally ?

94. What is your opinion on the present state of Indian law relating to marks and Trade marks and descriptions of proprietary and other articles of trade ? trade names.

95. Have you any criticisms or suggestions to make regarding the existing law and Patent laws. regulations relating to patents ?

- ation of ships. 96. Is it desirable and practicable in the interests of trade, to introduce a system of registration or disclosure of partnerships?
- railways 97. To what extent does the lack of transport facilities by road, rail or water hinder
erways. industrial development in your province?
- Have you any specific recommendations to make?
98. Have you any criticisms to offer regarding railway freights, the classification of goods, the apportionment of risk, and the regulation of rates?
- What are your proposals?
99. Are there any railway extensions necessary in your province to develop new or to extend existing industries?
100. Similarly, are there any waterways which should be constructed, extended or improved?
- ping freights. 101. Are you aware whether the external trade or internal industries of the country are handicapped by any difficulties or disadvantages as regards shipping freights?
- Can you suggest any remedies?
- ro-electric 102. What has been done in your province towards ascertaining the possibilities of
r surveys. developing hydro-electric power?
- Should further investigation be made in this matter?
- 102(a). Have you any criticisms to make regarding the effect of the Electricity Act on industrial enterprise?
- ing and 103. What difficulties have been experienced in the working of the Mining and
pecting rules. Prospecting Rules (1913)?
104. Are there any minerals that are essential for industries of Imperial importance that ought to be developed at public expense? (*E.g.*, minerals of direct importance for the manufacture of munitions of war, or minerals ordinarily obtained in commerce from one country only).
- est Department. 105. From the point of view of industrial enterprise, have you any criticisms to make regarding the policy and working of the Forest Department?
- What suggestions do you make.
106. What measures are practicable to reduce the cost of assembling raw forest products?
107. To what extent is it practicable to concentrate special kinds of these in limited areas?
108. What noticeable deficiencies in forest transport are known to you?
- What suggestions do you make for their removal?
- il competition. 109. Have you any complaints to make regarding competition by jail industries?

X.—GENERAL.

110. What suggestions have you to make for the development of any industry in which you have been actively concerned or interested?
111. Does your experience suggest to you any new industry for which India seems peculiarly suited on account of its resources in raw materials, labour and market?
112. What supplies of raw materials are known to you of which the use in industry or trade is retarded by preventable causes?
- What are these causes, and how should they be removed?
- 112(a). Have you any suggestions to make regarding the utilization of waste from raw materials?
- 112(b). Have you any suggestions to make regarding Government aid in the improvement of raw material, such as, cotton, silk, sugarcane, etc.?
- 112(c). What industries in the country are dependent on the importation of raw materials and partly manufactured articles from abroad?
113. Do you know of any supplies of raw materials for which there is a good case for investigation with a view to their development?

Evidence taken by the Indian Industrial Commission, 1916-17.

CALCUTTA.

WITNESS No. 78.

MR. H. G. GRAVES, *Controller of Patents and Designs, Calcutta.*

WRITTEN EVIDENCE.

Note on patents and inventions in India.

The number of patents applied for, and kept in force, despite the necessity for the payment of annual renewal fees, is a rough measure of the inventive power of the people. Confessedly, India has a low standard when judged in this fashion, but of course this aspect of invention, under which the inventor is enabled to obtain a monopoly by patent law, does not apply to the great advances made in irrigation, jute and so forth in this country. Taking applications from residents only, one application is made by every 2,000 applicants in the United Kingdom, 1,400,000 in India and 16,000 in Calcutta. In addition to applications by inhabitants a considerable number are made by foreigners and they are partly of a speculative nature, partly with a view of real working in the country, and partly to prevent or control unlicensed import of the patented articles. Probably the last reason is the most important in India where foreign, as compared with indigenous applications, were about equal in 1893 but bore a ratio of 5 to 2 in 1913. The war put a temporary stop to this increase of foreign patents, but it will be resumed and will continue for many years, as, under the present conditions of manufacture, India depends on foreign sources for new inventions. Nevertheless there are powers under the Indian Patents and Designs Act, 1911, for acquiring compulsory licenses, and for the revocation, of patents not worked in the country, so that manufacture need not be unduly hampered in the future. A special Act also deals with war conditions.

Apart from questions of novelty, the grant of a patent and its continued existence up to the ordinary limit of 14 years depends on the payment of initial and annual fees, which are as follows:—

In India Rs. 40 followed by payments of Rs. 50 annually for the 5th to the 9th years and Rs. 100 annually for the 10th to the 14th years—a total of Rs. 790.

In England, £5 followed by payments £5, £6, and so on up to £14 for the 5th, 6th up to the 14th year—a total of £100.

In consequence patents are generally allowed to expire when they are unsuccessful or unremunerative, but there are exceptions founded on sentiment, hope of better things, or something akin to blackmail. On the whole, however, the life of a patent is a measure of its value.

The annexed table shows the number of applications for patents in India and the number of patents alive on December 31st, 1915, differentiating between persons bearing Indian names, others resident in India, and foreigners.

The figures are too small to allow of any large deductions, but it may safely be said that the bulk of the inventions patented by Indians in the past are not of much value as a rule. There has, however, been an increase from 30 or 40 twenty years ago to 60 applications at the present time and this is a hopeful sign.

Inventions by other residents in India include those by Anglo-Indians and those by imported engineers. Curiously enough the numbers have remained about stationary in the neighbourhood of 135 annually for the last twenty years, although manufacture has increased so greatly during that period. Mainly this is to be accounted for by the fact that possible inventors are so engrossed by administrative and executive work, by running the works and looking after labour and the market, that they have no time to work out the details of an invention. If anything does occur to them, the tendency is to submit it to the manufacturer abroad, who can either supply improved machinery without investigation or else has facilities for embodying the idea in practice. Until India ceases simply to use machinery and really starts to manufacture it, this state of affairs will continue for one or two generations more. This view is supported by the increasing number of patents granted to foreigners, so many of which can only be for restrictive purposes. Many of these may be regarded as specially selected in view of the expense. Taking this fact and the different rates of renewal fees in India and England into consideration, the average life of the run of patents is fairly equal.

Although the numbers are so small, it may be of interest to note that the 54 native and the 196 "Anglo-Indian" patents alive and dating from 1901 to 1911 originated as follows:—Bengal including Bihar and Orissa 9 and 77; Bombay 22 and 40; Punjab 7 and 20; United Provinces 6 and 20; Madras 9 and 18; Burma 0 and 18; elsewhere 1 and 9.

In a few respects India has originated new inventions, *e. g.*, many railway signalling devices peculiar to the country; the Vandyke process of reproducing drawings—a method of world-wide use; the "limpet" washer for bolts holding corrugated iron roof which probably is little heard of because it has not been widely advertised.

Apart from what may be called modern machinery, India has devoted much attention to inventions for punkah pulling machinery, sugarcane mills, water lifts and handlooms. The first is practically dead, killed by the centrifugal fan. The old wooden sugarcane crushing mill was largely replaced, about 30 years ago, by the iron mill, introduced by a pushful and advertising manufacturer; but there improvements practically stopped and modern sugar machinery is not employed as it should be; in part this is due to questions of land tenure and difficulties of raising capital.

Water lifts are very attractive to local inventors but they seldom seem to know what is being done a hundred miles away and their ideas are elementary and not novel. The many forms in use are fairly economical and could best be improved by spending a few rupees on a more solid construction to avoid losses due to bending and friction; but co-operative irrigation from wells, by an engine and gang pumps, is much more promising.

Handlooms as now used in India are susceptible of enormous improvement and a very great deal has been done for the spinning and weaving industries by the schools which have sprung up during the last ten years. Even with all these improvements, such as the wider introduction of the well known fly shuttle, it is doubtful whether the hand industry will long withstand the factory, in spite of the help given by the excise duty which the factory is so anxious to abolish. Hand spinning is practically extinct beyond recall. The knowledge of hand weaving is intensely localized and both weavers and cloth merchants are intensely ignorant of known machinery. It is questionable whether the schools are even faintly aware of what really was done with the hand loom all over the world both before and after the power loom was introduced, even to the extent adumbrated in the Encyclopædia Britannica, but that does not prevent a would-be patentee from trying to get a monopoly for such old ideas as a change box for multiple shuttles, or an elementary form of draw-boy for lifting the warp threads for pattern weaving.

It is fairly clear that invention in India, in the sense of the Patent Act will not generally be a source of wealth for many years to come. The majority of men who now could invent are too busy with administrative work and the working classes include but few men who really can think of improvements and put them into practice like the skilled artizan in Europe or America. Meanwhile there is an enormous field for co-operation and for the saving of labour, a saving which lies not only in the extended use of appliances but also and even more importantly, in the proper direction of labour by "motion study" to eliminate useless, repeated and inefficient handling of material.

PATENTS IN INDIA.

Year.		INDIAN.		OTHER RESIDENTS IN INDIA.		FOREIGN.		TOTAL.	
		Applica-tions.	Alive Dec. 31, 1915.	Applica-tions.	Alive Dec. 31, 1915.	Applica-tions.	Alive Dec. 31, 1915.	Applica-tions.	Alive Dec. 31, 1915.
Renewal fees not due until 1916.	1915	70	...	105	...	270	...	445(a)	137(b)
	1914	56	...	117	...	415	...	588(a)	438(b)
	1913	65	...	132	...	508	...	703	590(a)
	1912	50	...	120	...	508	...	678(c)	606
	1911	64	22	142	75	601	427	807(d)	524
Renewal fees payable annually.	1910	62	10	137	35	468	179	667	224
	1909	74	7	164	23	457	111	695	141
	1908	57	3	142	12	352	67	551	82
	1907	63	3	135	12	417	81	615	96
	1906	65	2	144	14	411	62	620	78
	1905	71	5	143	6	372	43	586	54
	1904	67	...	135	9	350	33	552	42
	1903	47	...	126	4	363	17	536	21
	1902	53	1	144	5	327	12	524	18
	1901	46	1	140	1	310	10	496	12
All expired.	1900(e)	45	...	142	...	305	...	492(e)	...
	1899	34	...	118	...	329	...	481	...
	1898	45	...	126	...	310	...	481	...
	1897	43	...	114	...	294	...	451	...
	1896	49	...	124	...	287	...	460	...
	1895	42	...	137	...	238	...	417	...
	1894	32	...	143	...	200	...	375	...
	1893	22	...	177	...	176	...	375	...
Total		1,222	54	3,107	196	8,268	1,042	12,597	...
Yearly Average		53	...	135	...	360	...	548	...

(a) Affected by war.
(b) Figures incomplete.
(c) First year of 1911 Act; renewal fees only began to fall due in 1916.
(d) Last year of 1888 Act; rush to obtain certain advantages under it.
(e) All patents before 1901 have expired.

ORAL EVIDENCE, 27TH NOVEMBER 1916.

President.—Q. How long have you been in charge of Patents in India?—A. About 13 years.

Q. Before that for how many years were you in the Patents Department at home?—A. About 20 years.

Q. You say that "there are powers under the Indian Patents and Designs Act of 1911 for acquiring compulsory licenses and for the revocation of patents not worked in the country." Has this power ever been used so far?—A. About half a dozen times.

Q. Are there any cases that you can regard as typical, that would convey to us any special lesson?—A. I am afraid not. The chief case of a license under this Act was in reference to the manufacture of salvarsan, or the import of it, but it is chiefly the import that is affected. No proposal was made to manufacture the material in the country. Another case was the license of a patent for a bottling machine for aerated waters. The number is so small that no typical instance could be given.

Q. What determines the condition for a patent to expire? You say "in consequence, patents are generally allowed to expire when they are unsuccessful or unremunerative." Is there any formal way by which they expire?—A. They drop out of existence. The man does not pay his fees any longer and so the patent ceases.

Q. Do you declare their death by notification in the Gazette?—A. Yes. A weekly notification is issued with a list of patents applied for, granted and expired. That is published weekly in the "Gazette of India." Then quarterly I issue a small magazine and yearly a journal containing a summary of all these.

Q. Do they sell at all?—A. Well, to a certain extent. The early ones are out of print now up to the 1912 issue, so I issued a consolidated list to take their place.

Q. Is that selling well?—A. Oh yes, I suppose I have sold about 100 copies during the last two years. A certain number of copies have also been distributed throughout India, in places where they can be inspected by the public.

Q. I wish to refer you to your analysis of the number of patents obtained or applied for from different classes and different provinces. Do you regard those figures as too small to draw any general conclusion?—A. Yes.

Q. In Bombay the ratio of Indians to Anglo-Indians is as 22 to 40, and Madras as 9 to 18, but there are smaller ratios elsewhere. Are these figures too small to draw any lesson from them?—A. They are only to be regarded as matters of interest.

Q. What system do you adopt in examining applications for patents? How are they examined by specialists?—A. I am the only specialist in the office, and I have to examine every case that comes in. About 700 applications per year come in on the average. I don't profess to know everything, but I do what I can. If I think there is a fair hope of finding anything that would conflict with the applicant's claims, I search through the English specifications and also the Indian specifications. The office is so small and the number of patents so small, and the income so small, that we could not afford a crowd of experts to make a search.

Q. Could you not have honorary examiners, who would take up special cases, on the understanding that you classified the cases after casual examination?—A. To some extent that was done in previous years. I used to refer any case I pleased to the Public Works Department or any expert I happened to know and paid a small fee of Rs. 30. But this was very unsatisfactory, because the person consulted had no material or knowledge on which to base a wide search. A limited search was almost useless in many of these cases. I have arranged certain things in the office that enables me to search with a certain amount of facility.

Q. Facility perhaps, but what about confidence?—A. Confidence, no.

Q. That is very fine for your office, but what about the public?—A. I do what I am to protect the public.

Q. You don't mean by this that your search absolutely guarantees novelty?—A. It is absolutely impossible to guarantee novelty. Somebody, I think it was Mr. Gavin Jones, upheld the American office in this respect. There was an article in an American paper dealing with two or three patents in America that had been revoked by the Courts as not being novel though they had been passed in the Patent office for what they were worth, and for their novelty as far as they could determine it. The writer was very bitter indeed against the Patent office over their laws in this matter. Not that I want to attack the American Patent office, because they have a wonderful system and search as far as they can; but it is impossible for any Patent office in the world to guarantee the novelty of patents.

Q. Admitting that search is never perfect, is it a fair assumption to make that in America, and also in Germany, search is fairly effective and certainly results in excluding a number of frivolous applications?—A. Yes, also in England.

Q. Do you think that the fact that there is fair confidence in a new patent has any effect on the industrial development of these countries?—A. I should think the validity of the patent does not affect industrial development so much as the ability of the man to put the thing on the market.

Q. Still if a patent were obtained in a country where the search was known to be effective, would it not be an encouragement either to the financial man or the man engaged in the industry concerned either to buy out the patent or to work it?—A. Yes, within limits, but the limits are very hard to define.

Mr. C. E. Low.—Q. In the case of patents which are used for restriction, *i.e.*, patents held by people who actually make an article and don't want other people outside their combination to make it, what practical steps can be taken in this country to get the powers to work that patent?—A. They could apply under the present Patent Act to the Governor-General in Council for a license to work under this patent or for revocation of the patent.

Q. Have any such applications ever been received so far?—A. No, except in respect of the enemy patents for salvarsan and other things I have already mentioned, there has been no other case before.

Q. You remember about four or five years ago, under orders from the Government of India, you sent from your office a number of papers to certain public institutions in other provinces of India showing the patents which had been taken up? Has that had any practical effect in any direction, so far as you are aware?—A. I cannot trace any marked results, as far as I know, but they have been utilized to a certain extent more especially in Bombay and Madras.

Q. Previous to that what did the Bombay people do to get hold of this information?—A. They go into the Record office there and the clerks put them on to the papers they ask for.

Q. These papers were obtainable there then before these special orders were passed?—A. Yes.

Q. Now they are in public institutions?—A. In public institutions as well as in the Record office.

Q. Do you come in touch, in respect to patents, with technical institutions?—Do you hear from them asking for papers, or do you find any patents emanating from technical institutions; have they applied to you for any literature?—A. The fishery people in Madras have asked me several times and Dr. Harold Mann gets a supply from me of patent literature that he thinks would be of interest to his institute.

Q. Do the Madras enquiries suggest any practical results likely to come about, or were they merely unguided general requests for information by people who would not be able to make use of it?—A. The enquiries have not been with much point up to the present.

Hon'ble Pandit M. M. Malaviya.—Q. Is an Indian patent recognised outside India, so far as you know?—A. It is only valid in India.

Q. But a British patent is recognised in India and is valid in India?—A. No, the British patent only covers Great Britain and Ireland.

Q. And the patent of no other country is valid in India?—A. No.

Q. You say that patents are granted to foreigners, many of which can only be for restrictive purposes?—A. Yes.

Q. What is the restrictive purpose which they have in view?—A. To prevent people using or importing their patented article without their leave.

Q. For instance, an American inventing a machine may patent it here, and then no Indian can imitate or make it?—A. That is so.

Q. You say that the number of such patents is increasing?—A. Yes.

Q. And you also say that many of these may be regarded as specially selected on account of the expense?—A. I imagine that their patents are for machines that the holders think they will be able to sell in India, and so, on the off-chance of obtaining a market here, they patent them here, because if they did not patent them in India anybody in India can make those things.

Q. In your opinion many of these patents are obtained only for this restrictive purpose?—A. I think so.

Q. You say that there is power under the Patents Act for the revocation of patents not worked in the country. Do you know if that power has been exercised in any instance?—A. It has not been exercised, because nobody has thought it worth while.

Q. You say that probably many persons do not come to take out a patent because they are engrossed by administrative and executive work. May it not also be that they are not afraid that anybody may make these things in this country on account of the industrial backwardness of the country?—A. Possibly so.

Dr. F. Hopkinson.—Q. When you speak of "foreigners" in your evidence you include British subjects in the U. K.?—A. Yes.

Q. You speak of patents being taken out for restrictive purposes; I thought the object of all patents was restrictive?—A. That is so.

Q. I don't understand what is the point you wish to make of that, since the sole object of a patent is to create a monopoly?—A. It creates a monopoly by preventing anybody in the country from manufacturing, but they don't intend to manufacture themselves; they obtain the patent so that they can exclusively import.

Q. Is it not a fact that most patents taken out in India are taken out by foreigners with the object of preventing other foreigners from importing the patented article, and that the interests of India do not suffer in any way by that, unless the article is of such a nature that it can be manufactured in India. It only applies to a limited number of cases?—*A.* Generally that is so, but it prevents competition between two rival importers.

Q. Yes, but why should they go to the trouble and expense of taking out a patent unless it is with the deliberate intention of preventing competition. They are owners of inventions either in the United Kingdom or Germany or elsewhere, and their object in taking out a patent is to create a monopoly?—*A.* It is not wrong that it should be so.

Q. I don't see any other inducement except it be advertisement only.

President.—*Q.* I thought this system which was common in all countries was merely a recognition of international courtesy. If you don't allow an outsider to register patents here, they will not allow you to register patents in their country?—*A.* The original grant of a patent was made to anybody for the sale, making or working of any new manufacture within the realm. It was not for import only.

Dr. E. Hopkinson.—*Q.* It is making or using; that surely is the intention of the patents laws?—*A.* I think that it was not so in the early days.

Q. I think it has been the same. The point however that I want to get at is that you seem to think that in some way the interests of India are affected by what you describe as restrictive purposes. Is that avoidable?—*A.* Not at present.

Q. You have the machinery to enable you to cancel a patent for an article which can be made in the country and is not made?—*A.* Yes.

Q. And I don't know that the country can wish for anything more; is that so?—*A.* That is so.

Q. With regard to the search, I take it that the search is really made as a matter of efficiency in your own office?—*A.* I make searches as far as I can.

Q. When you find another conflicting patent, do you inform the patentee?—*A.* Yes.

Q. Can you amend an application?—*A.* Yes, I help them to do so in every way possible.

Q. Then you are the authority?—*A.* Yes.

Q. The specification is not published before the search is made?—*A.* No.

Q. And so no one can know of the application and no one can appeal before the Controller, as in England, against rectification?—*A.* Not until the specification is published, and then there may be opposition to the grant as there is in England.

Q. Do you hear the opposition?—*A.* Yes.

Q. Do you ever have cases of opposition?—*A.* Yes, I have about three or four in hand now.

Q. In these cases you are counsel and judge and jury; you make the search, suggest the amendments and decide the award?—*A.* I tell the applicant, as far as I can, all that is necessary to enable him to get his application into order, and then I am judge afterwards, as with the Controller at home between the applicant and the opponent in view of the additional matter brought forward by the latter after the publication of the specification.

Q. There is no provisional specification in India?—*A.* No.

Q. How long an interval elapses between the filing or the granting of an application, and publication?—*A.* About three weeks to a month.

Q. That, of course, is very rapid?—*A.* Perhaps we are at cross-purposes here. First the application comes in, then it is examined and accepted or rejected by me, and the average time for that is three months. Then, if accepted, the specification is sent to be printed, that takes about three weeks, and then comes publication.

Q. Then about four months elapses between the application and publication?—*A.* Yes, in most cases, but if the case is not originally in order, it takes more time.

Q. There is no legal obligation that a patent must be worked in the country, as in Canada?—*A.* No.

Q. Does the patent expire with the expiration of corresponding foreign patents?—*A.* Not under the present Act; it did under the Act that was in force before 1912.

Q. The Indian Act was altered to correspond with the British Act?—*A.* Yes.

Q. Are there any chartered patent agents in India?—*A.* There are three or four who call themselves patent agents, and do the chief part of the work in this country, but there is no chartered institute.

Q. If there was anything of that nature, don't you think it would give a great deal more confidence, as it does in England?—*A.* I suppose it would.

Q. You have no suggestion to make about it?—*A.* No, the business is so small.

Q. Has there been any patent litigation in India?—*A.* Yes, there is a small volume of it scattered about.

Q. Would you go so far as to say that a patentee, assuming that he believes he can establish his right to a monopoly, would fight infringers and would not be deterred by the

cost of litigation?—*A.* Yes, I think so. There is a case going on now in southern India over a handloom, and I am afraid the volume of litigation over that is something enormous, owing partly to the character of the parties to the case.

Q. The character of the parties, not of the case?—*A.* No. A Madrassé man has got a patent and another Madrassé man is infringing it.

Q. Would you say that patent litigation is unreasonably costly in India?—*A.* It is about as cheap as they can make it.

Q. It is not commensurable at all with what it is in England?—*A.* No, but there is more delay here, and less knowledge.

Q. I suppose the appeal lies to the High Court from the District Court and from there to the Privy Council?—*A.* Yes.

Mr. A. Chatterton.—Q. When a patent is granted in some foreign country, is that accepted as sufficient evidence of its validity for granting the patent in this country?—*A.* I think that good enough.

Q. When a patent is granted in England, Germany or America, has it to be filed contemporaneously here, or is an interval allowed?—*A.* It has to be applied for in India before the foreign specification is published here.

Q. The British Patent Laws do not apply to Native States, do they?—*A.* No.

Q. What Native States grant patents themselves?—*A.* Three do—Hyderabad (Deccan), Mysore and Marwar (Jodhpore), but there are very few patents granted in them.

Q. Suppose a man sets up the manufacture of machinery in a Native State, and then exports his machinery to British India, what would the patentees do in British India; can you bring a suit against the sale of the machinery in India?—*A.* Yes.

Q. Have you power to reject a patent on the ground that in your opinion it is of no practical utility?—*A.* Yes.

Q. Do you often exercise that power?—*A.* Sometimes, when I get a man trying to get a patent for perpetual motion. It depletes my records and saves him money.

Q. The utility of an invention is not considered in the British Patent office?—*A.* No.

Mr. C. E. Low.—Q. Have you any information regarding the conditions under which Government allows its servants to take up patents?—*A.* It grants a patent to any Government servant on the condition that Government has the free use of the invention; or on terms to be settled by itself.

Q. Are not a large proportion of the classes who would be likely to take out patents in this country Government servants?—*A.* Yes.

Q. Have you heard any complaints about the terms which Government gives to Government servants in taking out patents?—*A.* They fear the restriction, but when the restriction is put into practice they are reasonably treated.

Q. In a great number of cases where a Government servant happens to be in this country negotiations are taken up by the Government of India, but when he is on leave or in retirement when the patent is taken out, negotiations are carried on with the Secretary of State; have you reason to believe that the Secretary of State does not treat the patentee as well as the Government of India?—*A.* I think the treatment is perfectly fair.

Q. You don't think therefore that there is any fairness in the complaint that this has unduly restricted Government servants from taking out patents?—*A.* I don't think there is any restriction at all.

Q. That restriction or condition applies to all patents taken out by Government servants, whether based on knowledge arising out of their employment or otherwise?—*A.* Yes, and it is applicable to all persons whether they are Government servants or not, because under section 17 of the Act Government has the right to use any patent.

Dr. E. Hopkinson.—Q. That is exactly the same in the United Kingdom?—*A.* Yes.

Q. The Government have the right of user on terms, and those terms are settled by Government?—*A.* Yes.

Q. Do you know of a specific instance where Government have exercised that right, and arranged terms?—*A.* I don't believe it has ever exercised that right. It is in reserve, in case the man is unduly grasping, but Government, like other people, go into the open market and buy the patented article at market prices.

WITNESS No. 79.

*tr. J. A.
Chapman.*

MR. J. A. CHAPMAN, Librarian, Imperial Library, Calcutta.

WRITTEN EVIDENCE.

My experience has been gained as Librarian of the Imperial Library and as Principal, Government Commercial Institute, Calcutta, so that it could all be compressed into a statement in answer to questions 78, 79, 87, 88 and 80.

The question of libraries is one of (a) books, (b) access to books. There are collections of scientific and technical books in the libraries attached to the Forest, Geological and other Departments and such institutions as the Sibpur Engineering College. I may assume that all the books that should be got for these libraries are got, or rather it would be an impertinence that I should question it; and if it be not the fact, and that is witnessed to by some Geologist, Botanist, Engineer, or the like, then will be the time for a professional librarian to be consulted as to the remedy. His part would be, of course, to report as to the books published to persons competent to assess their value.

It is when we come to an imperfectly organised department, such as the Co-operative Credit Societies Department, or when it is a question of the literature of a subject that it is not the obvious business of some department or college to collect, it is then that the books themselves are not received in India, or they are, but in a public library such as the Imperial Library. Whenever we have (at the Imperial Library, I mean) clear proof that people depend on us for books of this or that class, as books on credit co-operative work, we get them, or we give information regarding them to the persons interested. Thus we give the Indian Tea Association information regarding Dutch books on tea-planting in Java.

Officers of the Surveys have free access to the Departmental libraries, and I may assume that any recognised Scientist would be given every facility to consult books. As a public librarian I am concerned with those European industrialists who do not belong to an organized body, such as the Tea Association, Indian industrialists (some of them, I gather, are shy of approaching a library known not to be a public library in the fullest sense), and the great mass of Indian students, the beginners, those who do not want merely access to books, but information as to what the books are, and advice as to what they should read. For these classes there is neither a sufficiency of books nor adequacy of indexing. The Imperial Library was organised as a literary, historical, and philological collection, and if it is more than that now, which it is, it is so more by accident than design. We have not bought many books on scientific and technical subjects, but we have been presented with considerable quantities, and having so begun to have collections of books of those classes, we have been led to add to them by purchase. We are still however very weak in those classes. The other public libraries that I have visited are weak too.

I would never suggest that the public should have free access to the departmental libraries, and it is hardly time, I think, for the suggestion that the public libraries should be placed in a position to spend much larger sums on books on technical and scientific subjects. *It is so common for the view to be held in India that there needs no more to make a library than that books be bought, that the last thing one wishes to do is to press for the addition of quantities to the existing quantities of unindexed books.* The advance that is obviously desirable might be secured by inter-borrowing and the compilation, on a common plan, of a card subject-index of the contents of the departmental and public libraries, and the maintenance of that index in each public library and by each University; possibly, too, of sections of it by the Chambers of Commerce. The Library of Congress subject-index in the United States, which owes its completeness as an index to the fact that so many books published abroad are registered for copyright in the States, is available for all the libraries. I want there to be such another index available in India, but, of course, not of books registered for copyright in India, but of books, etc., deposited in the Indian libraries. I take it that it is out of the question that our copyright law should be altered with a view to securing the deposit of foreign books with the Government of India for the registration of copyright. It is, indeed, a question whether such a change in the law would result in the receipt of many foreign books on technical and scientific subjects. Even in the States, if the number of registered German books of those classes is large, the number of English, French, Italian, and other foreign books is relatively small.

If there were maintained, at the Imperial Library in Calcutta, the Connemara Public Library, Madras, and elsewhere, a combined card subject-index of the contents of the principal libraries in India, and if inter-borrowing were permitted, all would be done, I think, that need be for the present. And if we had that index the authorities would for the first time be on certain ground in examining the question of the receipt of books in India. The index would show the classes of books in which all the libraries combined cannot show adequate collections.

The advantages that follow the issue of special monographs on industrial subjects and Government the publications of the Forest, Geological and other Departments would, of course, be increased publications by more scientific indexing in the public libraries. My experience has shown that it is not enough that the Geological Department, say, should publish an index to its Memoirs. In a backward country like India, and in a public library in this country, one must go a step further. One must combine such an index with all similar indexes and with one's own index of geological books. Otherwise people take one's own index of books to represent all that one has. They look up, say, "Marble," and see that we have such and such books on the subject, but they do not say—"But there must be papers on marble quarrying among the Memoirs of the Geological Survey of India, the United States Geological Survey, and so forth, and of those sets there exist separate indexes." It would be part of the work of compiling a combined index of the contents of the libraries in India, that when an index to a set of Indian Memoirs is prepared, some copies should be printed on one side of the paper only, and spaced to be cut up.

I think the advantages would be further increased, were the Government of India to issue from time to time such leaflets as the United States Government bibliographies of "Farmer's Bulletins", "Bulletins of interest to persons residing in cities and towns", "Roads—United States Government Publications.—For sale by the Superintendent of Documents," etc.

The experience I gained as Principal of the Government Commercial Institute is now a little out of date, so I will confine my remarks to one matter. It is that I regard it as absolutely essential that Government should see to the preparation of suitable books for Indian students in such subjects as banking, currency, the foreign exchanges, etc.

ORAL EVIDENCE, 27TH NOVEMBER 1916.

President.—Q. How long have you been in charge of the Imperial Library?—A. Six years.

Q. How many years have you been in Calcutta?—A. Nearly 16 years.

Q. So that your opinions are based on a fairly wide experience of Calcutta?—A. Yes.

Q. You say that you have not got many books on scientific and technical subjects. Do you get many applications for the use of such books?—A. What do you mean by "many"?

Q. In proportion to other books?—A. Say, 10 per cent.?

Q. I want to know what the percentage is if you can give it roughly. How do the figures compare with the requests for other class of books?—A. It has been a very small proportion hitherto.

Q. As regards making a general card subject-index of all the different libraries, would you propose to provide a staff for that purpose to go round to the other libraries and make a careful index of them?—A. I would have all the work done where the books are. If a particular book were in the Imperial Library, it would be indexed there. If there was a work in the Connemara Library at Madras, I would have it indexed there, and nowhere else.

Q. You would not trust to the local library to make its own index and provide you with the index cards?—A. I should; but if I found that there were cards that were of no use I would throw them away.

Q. I have never come across a library that was not understaffed. What is your experience?—A. They are all understaffed; but it does not take much longer time to index books well than to index them foolishly. And then men can be trained. I have now got a man from the Surgeon-General's Library and I am at present training him.

Q. Have you got a variety of staff—a variety of technical and other kinds of men?—Hitherto no.

Q. Would that be necessary in making such a card-index for subjects?—A. I do not think so. I often write to some one, or send a book to some one. You want in a library a man whose special business is the study of bibliographical methods, and he must have intelligence of course to know when he can index the books himself and when he must get some one else to do it for him.

Q. But would it not require a serious increase of your staff for this system of yours to be carried out?—A. Not very serious. We should need one more man at least for indexing. I do not think that the extra cost would be at all serious.

Q. You do not propose to disturb the constitution of the library as it is at present?—A. No. Not at all.

Q. What you really want is a sort of book census?—A. Yes.

Q. You make a suggestion that the Government should see to the preparation of suitable books for Indian students on subjects like banking, currency, the foreign exchanges, and other scientific and technical subjects;—books that would have a special application to this country. Do you think that this should be done by the Government and not left to private enterprise?—A. It is absolutely essential that Government should do it.

Q. For what special reason?—A. If left to private enterprise, as it has been hitherto, it is not done, or it is not done sufficiently well.

Mr. C. E. Low.—Q. What was the average budget provision before the war of your department for expenditure on new books?—A. We include books and periodicals under the same head. We had Rs. 10,000 a year.

Q. What does your staff consist of?—A. I am sorry to say that I have not the figures at my fingers' ends. There is the librarian, a head clerk, and about eight or nine clerks, a superintendent in the reading-room, and a number of sorters, a dozen dusting men, half a dozen coolies, etc.

Q. Are any of these men specialists in any subject at all?—A. No.

Q. Are they of the clerical type?—A. Entirely.

Q. Under what conditions are the public allowed to use the library?—A. People above 18 years of age may come and any one may borrow.

Q. And take the book away with him?—A. They have to give security if asked to do so—a deposit of money.

Q. I presume they are not allowed access to the shelves?—A. No, except in the reading-room.

The catalogues and indexes are in that room.

Q. What policy do you pursue in purchasing books out of the proportion of the Rs. 10,000 allowed for that purpose?—A. I think it suffers, if I may say so, unconsciously, modification from time to time. We were intended to buy everything about India. Then we found that there were certain classes of books about India which we had in great numbers, *e.g.*, books on *shikar* and we got tired of getting any more of them. If there is a request or a number of requests for a particular class of books, it inevitably means that we get rather more books of that class than we used to.

Q. Do you get specific requests from departments or officials including the departments of the Government of India to purchase certain particular books?—A. No, I ask some one to suggest a book or books of a class. They do not do it unless I take the initiative.

Hon'ble Pandit M. M. Malaviya.—Q. Have you any committee to help you in administering the affairs of the Library?—A. There is a council.

Q. Does it divide itself into sub-committees on different subjects?—A. It is a small body. It meets once a month.

Q. Who selects the book? Which is the authority which finally selects them?—A. I make a list of books getting other people, as a zoologist, a biologist, an engineer and so on, to help me, and I lay it before the council and they say, "get this," "do not get that," and so on. The council passes final orders.

Q. The number of your council does not seem to me to be sufficiently large to permit of sub-committees on different subjects being constituted?—A. By no means.

Q. How is this council appointed?—A. The Government appoints it.

Q. Is the number limited?—A. Yes.

Q. But it can be increased by the Government?—A. It could be. I hope it won't be.

Q. Can you give us an idea of the comparative number of books on literary, philosophical and historical subjects as compared with books on technical and scientific subjects?—A. Without notice I do not think such a question ought to be answered.

Q. I want just a rough idea. Will it be one-fourth, or half?—A. We have to decide what is to be our definition of a technical book to begin with.

Q. You have spoken of technical and scientific subjects in your note. Take it in the same sense in which you wrote it in your note?—A. I really could not put a figure to it.

Q. Not even an approximate figure?—A. I cannot give one; it might be grossly inaccurate.

Q. Have you a system of depositing a fee for taking out books generally or is a deposit to be made on every occasion?—A. A man leaves a sum for one year, or two years, or five years. A regular borrower gives us an amount, and we keep it until he leaves Calcutta, or ceases to come to the library.

Q. What is the amount?—A. It varies according to the number of books taken at a time, and also to their value.

Q. You say "I would never suggest that the public should have free access to the departmental libraries and it is hardly time for the suggestion that the public libraries should be placed in a position to spend much larger sums on books on technical and scientific subjects. It is so common for the view to be held in India that there needs no more to make a library than that books be bought, that the last thing one wishes to do is to press for the addition of quantities to the existing quantities of unindexed books. The advance that is obviously desirable might be secured by inter-borrowing and the compilation, on a common plan, of a card subject-index of the contents of the departmental and public libraries." Would you allow those who use your library to take away those books which you have borrowed from other libraries?—A. If the other libraries had no objection I should certainly. If it were their rule that books may be lent by themselves to borrowers, there would be no departure in principle if I were an intermediary.

Q. That might cause inconvenience and loss to those who wanted to use the library in the place where it exists?—A. Quite possibly. On the other hand they would get books from elsewhere which they would not get if there was no such arrangement.

Q. You do not think that each province is large enough to have a complete library of its own?—A. What do you mean by a complete library?

Q. A library such as would not put you to the necessity of borrowing from other libraries in the way you suggest, with more books on technical and scientific subjects, so that you may not be under the necessity of borrowing such books from other provinces?—A. I think it would need a very much larger expenditure on books.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. You say that you were once the Principal of the Government Commercial Institute?—A. Yes.

Q. What do you say about the establishment of a College of Commerce for the province? Will it be beneficial to the people or not?—A. It would depend upon so many things. It would depend so much, for one thing, upon the staff you got.

Q. With proper staff, we want to know your experience as the Principal of the Commercial Institute?—A. As long as you have in the matriculation examination one for which *all* the boys in the schools with a few exceptions are prepared, and for which they are sent up, and as long as you have a university like the University of Calcutta which says, "let them all come," you have a difficulty in getting any one, at least this is my experience, to look at anything else. A definite thing like the Civil Engineering College at Sibpur of course becomes established, and the Medical College becomes established. An indefinite thing like a College of Commerce would be, in my opinion, difficult to get people to consider seriously. You would probably have to conduct it for some years under the depressing influence of the thought that you had not as many students as you would have liked to have, and that they were of very inferior quality; that they were dregs from elsewhere. I had only one student whom it was really a pleasure to teach. His father was so miserably poor that he could not send him anywhere else.

Dr. E. Hopkinson.—Q. Is there anything to prevent your incorporating the index of the publications of the Geological Survey in your catalogue?—A. No, but I have been very busy so far, and have not yet had time. I simply want a staff.

Q. Have you suggested the method of printing the index on one side of the paper?—A. No. I propose to suggest a conference of librarians some time, and then to have these things discussed.

Q. With regard to the Government Commercial Institute, is the school still in existence?—A. Yes.

Q. You say that it is essential that suitable books should be prepared on such subjects as banking, currency, the foreign exchanges. Do you suggest that there are books which are unsuitable or there are no books at all?—A. I do not know of a book that you can compare with many books of the kind published at home, intended to be used by young men. I do not know of any such book published in India, dealing with Indian banks. One has to fall back on books about British banks and joint stock banks at home.

President.—Q. Do you mean to suggest that it is hardly time for the proposal that public libraries should spend much larger sums on books on technical and scientific subjects?—A. It is a question of spending *much larger* sums.

Q. Do you mean a sum like Rs. 3,000 a year in Madras and about the same amount in other towns of the same size, and ten times that amount in Calcutta?—A. I should say twice that amount (Rs. 3,000) for Calcutta. It would not be a waste if the books were bought for a library that was properly organised. Few Indian libraries are yet properly organised. There is, for instance, a great deal that is of value in, say, the library of the Surgeon-General; but I do not think it could be said that that library has been properly organised. We transferred certain medical publications which we received to it. I went the other day to find what had been done with them. They had done nothing; so I suggested that I should take them all back, and index them, and catalogue them; and that I should let him have a copy of our index, which would be placed in some conspicuous place in his library.

Q. Do you suggest that there is a certain amount of carelessness with regard to the use of libraries in India?—A. I think they are neglected, and not used as they should be. I think there is a great deal of great value in them. It is not that the libraries are neglected, because there is nothing very much worth while to go for in them. I think there is a great store of good books in India; but that it is not used, and that because it has not been indexed properly.

Q. Are you of opinion that if the libraries were properly stocked, indexed and properly cared for, the people would take advantage of them?—A. Certainly, yes.

Q. Are you judging from the experience of your library?—A. Our figures show a very steady increase in the number of books called for and given out in the reading-room. They go up steadily with each addition to the organisation and improvement in it. Putting a new catalogue in the reading-room seems always to have that result. That is very encouraging.

Q. Perhaps this modifies your suggestion that there should not be larger sums spent on books on technical and scientific subjects. If existing libraries were properly cared for, would they not be of more use and therefore do more good?—A. Undoubtedly yes. One does not want to suggest a larger expenditure on books, when what libraries cost in the way of cataloguing and indexing and so forth is so little recognised. It seems to me in India people think that a library is all right if there is some kind of clerk in charge.

Q. I quite agree with you about that. We want to be quite sure about this specific proposition, that if they were properly stocked, properly cared for and properly indexed, they would be of greater use in your opinion. Would you modify your written statement to that extent so as to make it complete?—A. Yes, when the proofs come to me.

Q. Have you got a copy of your annual report?—A. I have got a proof of the last one. It is in the press.

Q. That will show us the number of attendances at the library and the number of times that books have been borrowed and so forth?—A. It gives a great deal of information under these heads. I shall send you a copy of the report.

Hon'ble Pandit M. M. Malaviya.—Q. What is the total number of volumes that you have?—A. About 300,000.

Q. Have you given any special attention to technical and scientific subjects as you have given to literary subjects?—A. We pay due attention to scientific subjects. Each year we ask a geologist, a botanist, physicist, chemist, and so forth, to recommend books; but when you come to technical matters, such as welding, aeroplanes, or the like, we do little or nothing. If I see a book on jute that I think nobody else is likely to buy because it is in German, and think that some one would like to hear of it, I get it.

Q. So far as the recommendations of these geologists, botanists and other scientists are concerned, what is the test you apply?—A. We get all they recommend unless they are far too many. I asked a man the other day to draw up a list of works in the Greek and Latin Classics, and he sent me a list of books which would cost £100. We shall cut it down. But if a chemist or geologist sends us a small list, we buy all the books as a matter of course.

Q. So far as the importance of any technical and scientific book is concerned, it is left entirely to the gentlemen who recommend them to your attention?—A. Yes.

Q. You do not take upon yourself to decide whether the book should or should not be got?—A. Not the books that they recommend.

Q. Except on the ground of price?—A. On no ground whatever.

WITNESS No. 80.

MR. R. S. PEARSON, I.F.S., F.L.S., *Forest Economist, Forest Research Institute, Dehra Dun.* Mr. R. S. Pearson

WRITTEN EVIDENCE.

NOTE.—In answering the questions, only Forest industries and Forest problems have been taken into consideration, as I have no experience of other industries.

I.—FINANCIAL AID TO INDUSTRIAL ENTERPRISES.

Q. 5.—(i) I am in favour of either the part share capital system or Government pioneering, in cases where the undertaking involves large initial capital, as for instance, in developing the bamboo or elephant grass paper-pulp industries. The profits for a stated period to be divided between Government and the company in proportion to the capital supplied by each party. At the end of the fixed period the company to have the option of buying out the Government share and Government of charging a royalty on the raw product exploited from the Forest. Such an arrangement only to be undertaken in the event of no reliable company coming forward to undertake the business entirely on their own responsibility.

(ii) In the case of smaller enterprises, or in the case of established industries which are capable of improvement by the introduction of more up-to-date methods of working, such as, for instance, the palmarosa and lemon grass oil industries, or the collection and retting of forest fibres, or again the expression of oil from seeds of forest trees, which are at present worked on most primitive lines by petty contractors, the supply of machinery and plant on the hire-purchase system would perhaps be the best way of giving assistance.

Q. 6.—(i) Were the proposals suggested in answer to question 5 (i) adopted, Government should be at liberty to depute an officer to (a) inspect the companies books, (b) the factory and (c) have a representative on the Board, as long as they had an active interest in the undertaking.

(ii) In the case of plant which has been issued by Government on the hire-purchase system, only nominal supervision is necessary, as the purchaser will see to it that the plant in which he has a direct interest is not wantonly damaged. On the other hand any technical assistance should be rendered, if desired.

(iii) In certain cases it might be necessary to appoint Government Directors with definite powers to guard Government interests during the period in which direct assistance was being given; on the other hand I am very much in favour, when possible, of reducing Government supervision to a minimum. Once Government have decided to adopt a stated policy in connection with any industry and have satisfied themselves that the firm or company with whom they are going to co-operate is a reliable one, the undertaking should be left to that company to be run on commercial lines.

Q. 7.—My experience in connection with pioneer factories is limited to that of the Government Rosin and Turpentine Factories in the United Provinces and the Punjab, to the creosoting of *Pinus longifolia* sleepers in the United Provinces and to a very limited extent to the Government Tan-Extract Factory in Rangoon. I have no experience of demonstration factories.

Q. 8.—Under certain conditions pioneering work by Government will, without doubt, be necessary and advisable. It must be remembered that practically all extraction of forest produce had as a commencement to be carried out by departmental agency, and it is thought that this will be the case in many new ventures in the future. The conditions under which such pioneering work should be carried out are, when no company is willing to undertake the work, either on the part-share system or by obtaining a lease from Government.

The stage at which a pioneer factory should either be closed or handed over to a company, cannot be fixed with any certainty, it must depend on the nature of the venture. In any case a pioneer factory should not, in normal cases, continue to be under the control of Government after a second factory has been established by a company and is in working order.

II.—TECHNICAL AID TO INDUSTRIES.

Technical aid in general.

Q. 15.—I have been for seven years in charge of the Forest Economist's office, during which time my duties have been to carry out investigations either instigated by companies and private persons or by the Forest Department, of which the most important enquiries will be stated hereafter in answer to questions 16, 110 and 111.

Q. 16.—The Forest Research Institute has been instrumental in assisting the match, pencil, teabox, bobbin, rosin and turpentine, rosha and eucalyptus oil industries, in placing consumers in direct touch with the local forest officers and timber contractors, and in starting the business of treating timber, especially railway sleepers and in carrying out investigations as to the value of bamboos and elephant grasses for paper pulp, in co-operation with pulp and paper manufacturers in India. Many other investigations have been carried out in some of which companies are now commencing to take an active interest.

Q. 17.—Only in very exceptional cases should the loan of Government experts be made to private firms or companies, the work can generally be carried out at a Research Institute as a general enquiry.

Research abroad.

Q. 21.—We frequently submit samples to the Imperial Institute for valuation, latterly with more useful results. It is not an entirely satisfactory arrangement as it does not result in our getting into touch with firms at Home, the names of which are rarely, if ever, mentioned by the Imperial Institute in their reports. Results were anything but satisfactory on the only occasion on which arrangements were made with the Imperial Institute to handle a consignment of timber (sandal wood from Coorg) as a trial parcel to be sold direct on the English market.

Surveys for industrial purposes.

Q. 25.—We have a fair idea as to the outturn of our principal species of timber, but very meagre data as to the outturn of the other species or of the majority of our minor products, many of which are of recognised value. A complete survey of all forest resources would be of the greatest value. Such a survey cannot be carried out by the existing staff, as the local officers have already far more work to attend to than they can properly undertake.

Q. 26.—Such a survey could best be carried out by forming a Special Commercial Department in each Province, whose duties would be not only to carry out the survey but also certain other business, which will be dealt with hereafter, in answer to question 105.

Q. 27.—The object of such a survey should be to compile tables of the outturn of (a) timber and (b) minor products of present or prospective value, in each Forest District in British India, with notes as to facility of extraction, labour, and local price of the produce.

The publication of the above proposed tables through (a) local Directors of Industries, (b) through the Press and (c) a free circulation of copies of the tables to all industrial bodies, such as Chambers of Commerce, Associations, and large companies interested in forest produce.

III.—ASSISTANCE IN MARKETING PRODUCTS.

Commercial museums.

Qs. 28-29.—A commercial Forest Museum forms part of the Forest Research Institute; other Forest Museums exist at Poona, Coimbatore, Pyinmana, Balaghat, and Kurseong, most of which have instruction as their primary object. The creation of Commercial Forest Museums at industrial centres is strongly advocated. Such museums should aim at commercial development and not be of a popular character. They should be run by the commercial staff of the Forest Department, the creation of which is advocated elsewhere in this note.

IV.—OTHER FORMS OF GOVERNMENT AID TO INDUSTRIES.

Supply of raw material.

Q. 40.—Of recent years the policy of Government has been to grant leases on favourable terms to companies for the extraction of raw forest produce, in connection with new industries. On the other hand it must be admitted that companies and private persons have been slow to take advantage of the obvious desire on the part of Government to help in this connection the initiation of new ventures, so that it seems fairly certain that Government will have to act as a pioneer in certain cases. The policy of giving leases on favourable terms has the drawback that it generally binds Government to an agreement for a long period, during which conditions invariably change and often in a way that is least expected. On the other hand financial aid, such as is advocated in the paragraph answering questions 1—5, is generally

fixed for a comparatively short period. In the event of financial aid not being desired, but a lease on favourable terms advocated, the first lease granted for a new industry should, in my opinion, be granted on favourable terms, such as non-payment until the factory is in working order, and after that on a sliding scale for a fixed period.

VI.—GENERAL OFFICIAL ADMINISTRATION AND ORGANISATION.

Qs. 57, 60 to 62.—(i) I am not in favour of appointing an Advisory Board but of creating posts of Directors of Industries in each province. To have an Advisory Board and a Director of Industries would make the machinery so cumbersome, that it would probably defeat its own object. It is possible that even the Directors of Industries might find some difficulty in keeping in direct touch with forest industries, as their sphere of action would generally be far removed from forest areas, but, on the other hand, this difficulty should be largely overcome by the appointment of a forest commercial staff.

From my limited experience in working with the Director of Industries, United Provinces, I consider that considerable advantages to forest interests would result from mutual co-operation, in other words that appointment of such officers would be likely to result in materially assisting the development of forest industries.

(ii) The Director of Industries should confine his attention to enquiring into the possibility of starting new industries, formulating proposals when the enquiries reach an advanced stage, assisting existing industries, answering enquiries, and publishing commercial statistics. I am entirely against laboratory research work being carried out by a Director of Industries. Such work should be carried out by a body of experts under central control.

(iii) The choice of Directors of Industries is largely a personal equation, and sound arguments can be put forward for the appointment of either a business man, an official or an expert, all of whom might possibly have desirable qualifications. It amounts to this that provided the man has powers of organisation, a fair stock of business qualities, tact and common sense he is likely to turn out a successful Director. An expert in some very specialised subject would in all probability be found unsuitable for the post.

(iv) I am absolutely against an Imperial Department under a single head, for the same reason that an Advisory Board and Director of Industries in one province is undesirable; the greater the number of offices and officials to deal with commercial problems, the slower will be the development of indigenous industries. One Director of Industries, supplied with an adequate staff of commercial assistants, will do more to attain the object in view, provided there exist competent experts to whom he can refer in technical matters, than the more complicated machinery which would come into existence by the formation of Advisory Boards and the appointment of Directors of Industries, backed by an Imperial Department, under a single head.

(v) To correlate the separate activities of the various provinces as regards industries, conferences should be held, at which programmes of work should be discussed and overlapping eliminated; moreover mutual co-operation should be introduced as far as practicable. I am not at all certain whether a limited degree of healthy inter-provincial competition in such matters would not be beneficial.

VII.—ORGANISATION OF TECHNICAL AND SCIENTIFIC DEPARTMENTS OF GOVERNMENT.

Q. 63.—(i) To develop the scientific side of the Forest Department, the Government of General India created, in 1906, a Forest Research Institute at Dehra Dun. The sections into which the work is divided are (a) silviculture, (b) botany, (c) zoology, (d) chemistry and (e) economy, the latter dealing with the development of forest industries and the marketing of both major and minor products, while the Chemical Adviser works in close co-operation with the Economists. The Institute is under the direction of a President, who is also President of the Forest College. The staff of the economic section consists of an Economist, Assistant Forest Economist (vacant at present), a Museum Assistant and clerical staff. The services of a Cellulose Expert and Tan Expert have been secured, but these appointments are of a temporary nature.

(ii) It is generally acknowledged that the numerical strength of the staff in the economic branch is inadequate and its composition anything but perfect. To expect one man to be expert in all the branches which are connected with forest utilization is to ask the impossible. It is necessary to have experts for each separate important branch of the subject and for this purpose the staff should be constituted somewhat as follows: (a) a head of the economic section, who besides direction should take up one branch subject, (b) a timber expert, (c) a cellulose expert, (d) a tan expert, (e) an expert in the antiseptic treatment of timber, (f) an expert in dry distillation of timber, including the manufacture of charcoal, (g) an expert in gums, resins and oleo-resins, (h) a specialist in other minor forest products and (i) a business man. As time goes on the staff would no doubt have to be enlarged by the addition of assistants, while the economic section should be under the orders of the President, Forest Research Institute, as at present.

Such proposals may appear to entail a larger staff than is necessary, but if reference is made to the staff in the corresponding section of forest economy in the United States of America (a copy of which is attached) it will at once be seen that the proposals are in proportion very moderate. In further support of this assertion it may be mentioned that at

Wisconsin, the staff of the forest economic section consists of from 80 to 90 men of which over 40 are experts, who have to deal with far fewer kinds of timber than are found in our Indian forests and in whose country, with the exception of pine resin, practically no minor forest products exist. Similarly, the chemical section of the Forest Research Institute is understaffed, and should be dealt with in the same way as that advocated for the economic section.

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artments.

Qs. 64 & 67.—I am strongly in favour of Imperial scientific and technical departments for chemistry, botany, geology and zoology, from which men could be deputed for special work in connection with—as far as my department is concerned—forestry. Were such an officer deputed from one of those departments to Forest Research Institute, he should be, as far as details of work are concerned, under the orders of the President, Forest Research Institute, and Sectional Officer, that is, he should be lent to a department though his name would be borne on his own departmental list and his promotion regulated accordingly.

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artments.

Q. 68.—If Local Governments engage experts of their own to investigate local forest problems, which in my opinion is very advisable, such officers should be affiliated to the central Forest Research Institute, at which place they should spend a portion of the monsoon months to work out the problems in which they are specially interested and also to keep in touch with new enquiries and with commercial development. Such officers, as a commencement, would probably have to be forest officers, until such time as a man from the commercial staff could be made available.

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utes.

Q. 71.—All Technological Research Institutes should be fitted into a general development scheme for the whole of India, controlled by an Imperial governing body.

IX.—OTHER FORMS OF GOVERNMENT ACTION AND ORGANIZATION.

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it.

Qs. 105-106.—(i) The area in charge of the Forest Department amounts roughly to $\frac{1}{4}$ the total area of British India, or approximately to 245,612 square miles. The staff employed to manage and protect these forests consists of 234 trained Imperial and 295 trained Provincial officers. From these figures it will be readily understood that the officers in charge of such a large area have little or no time to do more than carry out routine duties, protect their forests and gradually introduce more scientific methods of management. Then again, the training given to those officers has largely been restricted to purely forest subjects, and relatively little time could be spared for such subjects as utilization and forest engineering, with the result that the tendency of officers when they come to this country, is to devote their energies to silviculture, management and protection, at the expense of the commercial side of the business.

(ii) To overcome these difficulties the creation of commercial and engineering sides to the Forest Department is advocated thus following the lines of railway administration, whose establishment consists of an engineering, a locomotive and a traffic staff. Were the above proposals accepted, the Forest Service should be divided into four sections, *i.e.*, forest management, forest commerce, forest engineering and forest research.

(iii) The officers of the forest commerce section should be in charge of all sales of timber and minor products, department sawmills, demonstration factories, seasoning and treating plants, depôts and forest museums. They should also be responsible for the issue of commercial statistics, and form a link between the forest officer and the commercial world and with the assistance of the Forest Research Section work out schemes for new forest industries. It would obviously be impossible to hand over at once all the above duties to the commercial section. The introduction of such a scheme would have to be gradual and would be guided by further experience. The recruitment of the staff should be from men who had received a commercial training, backed by some commercial experience. It is thought that as a commencement it would not be advisable to have a large staff, probably one man per circle would be sufficient, though in such places where large depôts, Government sawmills, or pioneering factories exist, one or more assistants would be necessary. On the basis of one man per circle the staff would amount to approximately 25 men for the whole of India and Burma.

(iv) Mention was made above of a forest engineering side to the department. For many years the need of technical advice in engineering matters has been felt by all forest officers who have run up against engineering problems of extraction, either by land or by water. To overcome this difficulty the Bombay and United Provinces Governments have appointed engineers, as a temporary measure, to enquire into and assist in forest engineering problems. These steps are all in the right direction but are inadequate to meet the requirements of the case. One of the chief difficulties in marketing the so-called "Inferior Species" of timber is due to want of mechanical means of cheap extraction. To cite only one case in point, the Himalayan spruce and silver fir, which are very suitable for the manufacture of match splints, for boarding, planks, etc., cannot be got out sufficiently cheaply to allow of their being utilized, simply for want of proper means of extraction. This is but one instance, others will be mentioned hereafter in answer to question 108. The urgent need for Forest Engineers is equal to that for commercial men, in fact the appointment of the former staff is a corollary to that of the latter.

Q. 107.—The formation of plantations and the more concentrated working of the forests is a silvicultural question, which will no doubt be dealt with by the proper authorities. It is

of the greatest importance in connection with certain industries, such as match and pencil making, in which cases plantations might with advantage be created by the companies utilizing the timber, as well as by the Forest Department.

Q. 108.—A very long list could be prepared of cases in which forest transport is difficult, and no doubt particular instances will be supplied by local forest officers. A few specific cases which have come under my notice may be mentioned, *viz.*, (1) the difficulty in extracting timber, chiefly teak and rosewood from the felling areas to the Tavargatti depôt in the Belgaum Division, (2) the very indifferent floating facilities on the Kalanudi for the extraction of teak logs from Gund in the Kanara Division, both in the Bombay Presidency, (3) the slow and somewhat expensive methods of moving teak and other logs from the felling areas to the floating streams in many Divisions of Burma, which is now carried out by drag elephants, (4) the exploitation of the fine forests in the Jaipur Reserve of the Lakhimpur Division of Assam is at a standstill for want of mechanical traction, (5) the laborious methods of carrying and carting timber from the Melghat Division of the Central Provinces to the plains, where probably a rope-way would facilitate and cheapen matters considerably, (6) the difficulty in extracting spruce, silver fir and other timber from the Punjab and United Provinces for want of mechanical appliances. The question is asked as to how these difficulties could be overcome, and the answer without doubt is the employment of Engineers to enquire into and devise means of overcoming the difficulties in each individual case, which for want of time and in some cases experience also, precludes the work being carried out by forest officers.

X.—GENERAL.

Below is given a list of industries, the enquiries about which are either completed, or are in progress of completion or about which, owing to the supply of raw material available and the conditions of the market, an investigation as to the possibility of starting a new industry is thought to be justified:—

- (i) The manufacture of paper-pulp from either bamboos or elephant grasses. Suggested localities for the former industry are Burma, Arakan, Chittagong and west coast of India, for the latter, Assam, on the banks of the Brahmaputra and Monas Rivers, in the United Provinces, Bengal and possibly Burma.
- (ii) The introduction of permanent and portable sawmills, either to produce constructional timber especially of other than the major species or in connection with small industries, such as the manufacture of packing cases, turnery, furniture making, rough-cutting of felloes, naves, spokes, shafts, railway keys, tool handles, shingles, dry goods barrels, etc. It would probably be found necessary to erect a seasoning plant in conjunction with the sawmills, when working for special purposes, such as furniture making, wheel-wrights work, turnery, etc.
- (iii) The erection of antiseptic treating plants, especially in connection with the treatment of railway sleepers and mining props. The treatment of sleepers has a twofold object, *i.e.*, to supply the State and Company Railways with sleepers and to more fully utilize certain hardwoods for which at present there is only a limited demand. In this connection the manufacture of coaltar creosote is advocated as a new industry in India.
- (iv) The manufacture of three-ply boxes. Assam, Burma and the Andamans are probably the localities from which sufficient supplies of raw material could be obtained with which to start this industry.
- (v) The manufacture of both jute and cotton bobbins. A large demand exists for bobbins in Calcutta, Bombay, Cawnpore and elsewhere. Suitable timbers at reasonable prices have been found for the purpose so that there appears no reason why this industry should not be developed.
- (vi) The preparation of paving-blocks. The enquiry is in hand and provided the tests being carried out in Bombay prove successful, a new industry may arise in India. The experiment with *Sal* paving in Calcutta have not proved successful.
- (vii) The manufacture of bazar toys suggests itself as a village industry.
- (viii) The encouragement of the match industry, especially with reference to the utilization of Himalayan spruce and silver fir for splints.
- (ix) To further investigate the possibility of manufacturing pencils in India combined with the manufacture of pen-holders, rulers and other stationery requisites.
- (x) The preparation of ropes, twine, etc., from bast fibres of forest trees, shrubs and herbs, such as *Helicteres Isora*, *Sterculia villosa*, *Grewia* and *Ficus* species, *Trema orientalis*, *Wrena lobata* and others, might with advantage be encouraged as village industries.
- (xi) The manufacture of tan-extracts from mangrove bark. Large forests of pure mangrove or mangrove and 'sundri' *Heritiera minor* exists in Aracan, on the

- Bassein coast, and in Tavoy and Mergui, whence large supplies are available. The possibility of preparing tan-extracts from myrabolans, *Terminalia chebula*, and from barks, such as that of *Acacia arabica*, *Xylia dolabriformis*, *Terminalia tomentosa*, *Terminalia paniculata*, *Shorea robusta*, *Anogeissus latifolia* and the leaves of the latter species is also worthy of consideration.
- (xii) The question of preparing rosin, turpentine and gum from *Boswellia serrata*, gum oleo-resin; a tree found all over the dry zone forests of the Peninsula, has been under investigation for four or five years at the Forest Research Institute. Most of the difficulties have been solved, and the products well reported on, while the financial aspect is also satisfactory so that an important industry may in time be expected to develop.
 - (xiii) The extension of the *Pinus longifolia* rosin and turpentine industry in Kumaon and the Punjab, and to enquire into the possibility of starting a similar industry, working with *Pinus Khasya* in Government and leased forests of Assam and in the Lower Shan States of Burma.
 - (xiv) The substitution of steam instead of direct-fire distillation in the manufacture of *rosha*, *lemon grass* and *citronella* grass oils.
 - (xv) The production of 'khas-khas,' *Vitiveria zizanioides* and 'kuth' oil from *Saussurea Lappa* in the United Provinces and in Kashmir, respectively.
 - (xvi) The extraction of oil from seeds of forest trees, for soap making, burning, cooking and for the conversion of liquid fatty oil into solids. Amongst other such seeds which deserve attention are *Taraktogenos Kurzii*, *Schleichera trijuga* and *Vateria indica*, about which considerable information has been collected, demonstrating their commercial possibilities.
 - (xvii) The introduction of improved methods of preparing cutch and kath from *Acacia Catechu*, which enquiry refers to Burma, the United Provinces, Madras, and to a lesser degree to the Central Provinces, Bengal and Bombay.
 - (xviii) Extension of the cultivation of lac and the introduction of improved methods of collection and preparation.
 - (xix) The introduction of improved methods of manufacturing charcoal and combining this industry with the preparation of Stockholm tar in pine areas and of Wood tar where broad leaf trees are utilized.
 - (xx) The preparation of *winter green oil* and natural salicylic acid from the leaves of *Gaultheria fragrantissima*, found in the Khasya Hills and said to be very common on the Nilgiris. (Gamble.)
 - (xxi) Organization in collection and in some instances the cultivation of forest drugs, such as *Podophyllum Emodi*, *Strychnos nux-vomica*, *Aconites*, etc.

No. R. P. Z., dated 22nd August 1916.

From—The Director, Forest Products Laboratory, Madison, Wisconsin, United States of America,
To—The Forest Economist, Dehra Dun.

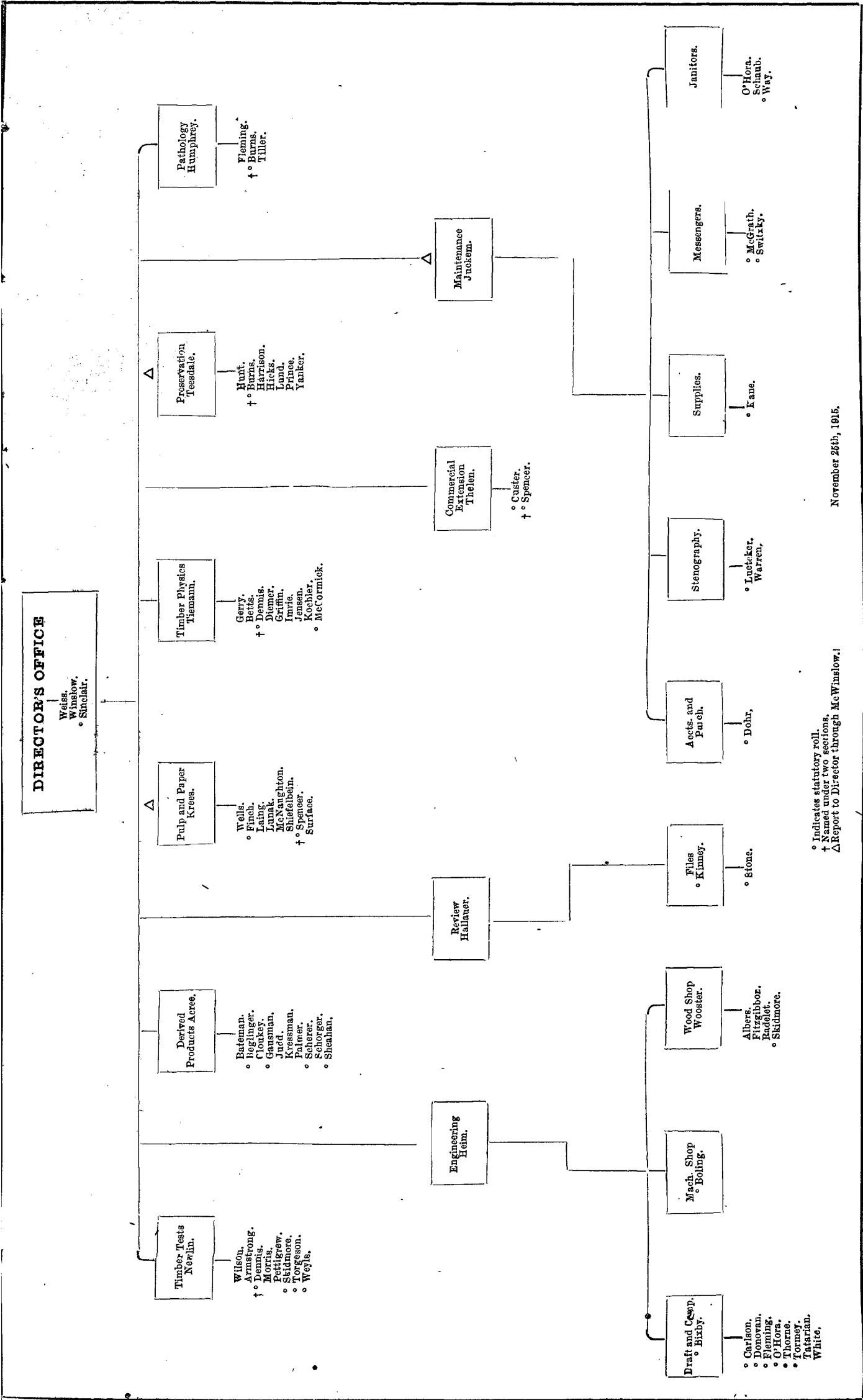
Your letter of June 26 is received. The Forest Products Laboratory was established at Madison, Wisconsin, in 1910, by the Forest Service of the United States Department of Agriculture. We have the co-operation of the University of Wisconsin to the extent of furnishing building, heat, light and power. The building was erected at an expenditure of about \$50,000 and the heat, light and power represent a cost of about \$6,000 annually. The laboratory equipment is available to the University for research and several lecture courses are given by members of the laboratory staff at the University; for example, on timber construction, wood preservation, wood structure, and chemistry of forest products.

The laboratory equipment valued at over \$100,000 was furnished by the Government, which also makes an annual allotment of about \$140,000 for salaries, maintenance, etc.

There are between eighty and ninety employees, and about forty of these represent the technical staff, that is, are people with technical or scientific training, chemists, chemical engineers, engineers, physicists, and foresters. The organization is shown diagrammatically on the enclosed blueprint.

Formerly, the results of our investigations were all published in Government bulletins, but this has gradually given way to publication in the trade and scientific journals. Only the more complete or exhaustive monographs are still issued by the department. I am sending you under separate cover a number of reprints showing the kind of material going to various journals, and a copy of departmental bulletin 343, "Groundwood Pulp," as representative of the departmental publications. I am also sending you a little pamphlet which outlines briefly the nature of our work with photographs of experimental apparatus, and finally copy of a report of our more important investigations and their relation to the industries.

If we can be of further assistance to you I shall be very glad to have you write us,



ORAL EVIDENCE, 29TH NOVEMBER 1916.

President.—Q. For how long have you been Forest Economist?—A. For eight years.

Q. What staff have you?—A. None, except myself. I have had an assistant off and on. He is now at the war. At present I have nothing but a Museum Assistant.

Q. It is possible for you to give us an idea as to the number of communications you get from the commercial community and other people asking for information? Could you express in any convenient way the quantity and variety of work that you have to do as Forest Economist?—A. I could not explain that to you easily, as my work is so split up. Firms make enquiries and also forest officers. These enquiries have gone up from 400 to 2,600 a year, in the last eight years.

Q. Do many of these matters require long investigation?—A. Some; others are absolutely trivial.

Q. Is this thoroughly a correct idea of your functions; that you receive from people of various kinds enquiries as to what forest products are available for use in certain industries, and you also tell commercial people what opportunities there are in regard to raw materials for developing industries?—A. That exactly represents one side of the work. The other side is the programme of work which is fixed every three years.

Q. For research work what staff have you got? Have you a Chemical Adviser?—A. We have a Chemical Adviser, who has an assistant not very highly trained.

Q. What other subjects, in addition to chemistry, would arise? What about the physical characteristics of your timbers?—A. The chief heads under which they come are testing of timbers, identification of timbers, identification of forest products and their uses, such as pulp in all its forms, *i.e.*, bamboo, grass and wood pulps, treatment of timbers, dry distillation, which includes charcoal, etc.

Q. Would you mind looking at your note. In answer to question 16, you say—“The Forest Research Institute has been instrumental in assisting the match, pencil, teabox, bobbin, rosin and turpentine, rosha and eucalyptus oil industries, in placing consumers in direct touch with the local forest officers and timber contractors, and in starting the business of treating timber, especially railway sleepers, and in carrying out investigations as to the value of bamboos and elephant grasses for paper pulp, in co-operation with pulp and paper manufactures in India.” Did not the Forest Department issue a special memorandum on materials for match-making?—A. Yes.

Q. Did they recommend the use of *Simal* wood?—A. They did, without a doubt.

Q. Are we correct in assuming that the complaint made against the Forest Department is justified that they recommended the use of unsuitable wood, and let the match manufacturing companies into an unnecessary amount of expense?—A. I agree; it was not, however, the investigator's fault. He was no doubt misled. I don't blame him in the least; I should have done the same myself.

Q. Should it not have been known to any forest officer that *Simal* wood disintegrates?—A. That is not the reason, the cause of the trouble is that the timber does not peel properly. It is wood which has a twisted fibre. In peeling you get 70 per cent. of good matches and 30 per cent. of bad.

Q. Is not the process of disintegration itself a drawback?—A. No one can claim that the matches are rotten on account of the wood disintegrating. It is a soft wood. It does not cut to a square split, and therefore cannot be dipped uniformly. The twisted fibre causes the match to break in two. Wood of just the same strength if straight grained would not break. It is the twisted fibre which is the cause of the trouble.

Q. What gave rise to the suggestion that *Simal* would be suitable?—A. It was tested by a reliable firm at Home and passed by them as eminently suitable.

Q. Were they a firm of match-makers?—A. No, they were a firm manufacturing match-making machinery.

Q. Did they give a favourable report on the wood?—A. Yes, and possibly it was a *bona fide* report. It was a German firm.

Q. So that you think that the forest officer was misled as well as the company?—A. It is possible the company were. I was not there at the time, but it is quite possible that an English firm would be misled by being sent only a small sample to test. The forest officer naturally picks a good piece to send Home, and thus mistakes arise, especially when it is sent to a firm who makes machinery. Anybody who sends timber to a firm who makes machinery will obviously get a good report on the substance, because the people want to sell their machinery.

Q. Would it be equally a mistake to get a report from a firm who made matches?—A. If they did not import matches into India a fair report might be expected. If they imported the article into India it would be a serious mistake to send them sample for report.

Q. You refer to having received reports from time to time from the Imperial Institute. These reports, I understand, were of a very variable character?—A. Very variable.

Q. Were they based on research work done by the authorities?—A. Yes.

Q. Do you get the names of the authorities who do the work, or do they merely send those official reports?—A. They are nearly always official reports. They tell us who carried out work in the laboratory, but they generally do not tell us, if they send a commercial sample to a firm, the name of that firm.

Q. It is important for you to know the names of the firms who have given these valuations, and opinions, as well as the names of the authorities who have done the work?—A. In certain cases, without a doubt, it is useful.

Q. You say that you are against laboratory research work being carried out by a Director of Industries, and that such work should be carried out by a body of experts under central control. Does that mean that you would not allow a Director of Industries to have a laboratory for making small tests of a physical and chemical kind?—A. I meant simply as a matter of principle that the work should be carried on in one place to save duplication of work.

Q. Supposing research work was required under a Director of Industries, because of peculiar local circumstances; would you allow the transfer for the time being, whether long or short, of a member of the Forest Department to conduct that research work in consultation with the Director, possibly in his laboratory or in the adjoining fields?—A. Yes, certainly. I am not very much in favour of allowing experts to go and do work, say, for a company, because it brings in so many difficulties, but with a Government official, like a Director of Industries, I don't think there would be any objection.

Q. You say that the Director of Industries need not be a business man necessarily, in the sense, I suppose, of a man with commercial experience, but he should have a fair stock of business qualities, tact and commonsense. Afterwards you propose to augment the Forest Department by the appointment of a staff of business men. Do you mean men of commercial experience, in order to dispose of your forest products?—A. Possibly it might be convenient to have a forest officer.

Q. Would it not meet your point if the Forest Department were enlarged sufficiently to provide enough officers, not only for conservation work and engineering work, but to deal with the commercial side? Is it necessary, in your opinion, that those officers who have to deal with commercial firms should have commercial experience in advance? Don't you think that your forest officers have sufficient business qualities?—A. No, I don't think for a moment they have. I have been a divisional officer myself for a number of years and know for certainty that they have not got sufficient commercial knowledge.

Q. Can you expect that they will show a knowledge of business methods if the whole of their service is devoted to work on the forests. Forest officers are overloaded with the work of conservation and the usual official routine. Would you expect any of them to show a knowledge of business methods?—A. Surely, some would by training develop into quite good business men.

Q. If you had a larger number of forest officers, not so loaded with official routine duties, would they not show some of these qualities?—A. Certainly, but why put an engineer to do traffic superintendent's work when you have a trained man to do such work, and *vice-versa*?

Q. In your opinion should a knowledge of the forest be greater than a knowledge of business methods, or should a knowledge of business methods supersede a knowledge of forest resources?—A. You cannot often get a forester to come forward and do commercial work. That might be all right in theory, but not in practice.

Q. If you appoint to the Department an officer who is not a forest officer but a business man, is it not likely that he will soon neglect the point of view of a forest officer and that there will be friction between him and his subordinates. If, on the other hand, the officer who is doing the commercial and business side is a forest officer of some experience, he will be able to look at the problem from the point of view of the conservator first and the business man second. Which should be the predominant feature of such an official?—A. We have got men working who are not forest officers, *i.e.*, the manager of Bhawali, the man in charge of the antiseptic treating plant. So far there has been no trouble whatsoever; besides the forest officer can be relied upon to look after forest interests.

Q. Must not the balance of interest between exploitation and conservation give rise to difference of opinion?—A. That is true, but I don't think it necessary to appoint forest officers, though if you found three or four men in the Forest Department suitable for the commercial side, they should not be debarred from appointment to such work. This might bridge over the difficulty to a certain extent.

Q. What kind of men would you recruit for this forest commercial section; would they be recruited on the present lines for the Forest Department?—A. Not at all, I should pick up likely men who had some Indian experience.

Q. What prospects would you offer them in the way of pay, service, promotion, etc.?—A. I should offer them exactly what the forest officer gets already, otherwise you would have a breach in the two branches of the service.

Q. You would have them as a parallel line?—A. Yes.

Q. And a staff of something like 20 or 30 men?—A. Yes, and increase it if it worked well. As I tour through the various provinces, I find that I have to do the work of the commercial man in each province for a fortnight or three weeks. If we had local men who had more experience of each province than I have, they would at once be able to tell the forest officer the price of timber, and the requirements of the market. At present the men are absolutely case bound in their districts and cannot get out. I know of a case in which two officers in adjoining districts who were bidding against each other while trying to sell *Sal* sleepers, one offering sleepers for R2-4 and the other for R2-8. They could have got R2-12 if they had had a commercial man working for them.

Q. All that is in favour of developing the commercial side of the Forest Department, but the point I am now narrowing the issue to is with reference to the kind of man you would recruit, would the prospects you offer him prove attractive? You would have a commercial man in each circle; what would happen to the senior man? Would these men always remain as sectional commercial men, one attached to each circle?—A. You would have to have them on a common list.

Q. Will they all do the same work?—A. Yes; it would make no difference if we had two or twenty divisional officers.

Q. Would it not be an advantage if your young forest officer, say, of ten years' standing—supposing you had a staff sufficient for the purpose—could be spared to do this commercial work, one in each circle. After getting this commercial experience, he would be available for promotion and ultimately become a conservator. Don't you think he would be a better conservator for having commercial experience also?—A. That means you chop and change with you commercial men. Until a man has got three or four years' service as a commercial man, he would be practically useless. He would not be in personal touch with the companies dealing in timber.

Q. The real point I want to be quite certain about is whether the men required for a commercial side of the Forest Department can be better obtained by direct recruitment or by enlargement of the present forest service and selection of extra men of five or ten years' service to be attached to each circle for the purpose of assisting in the disposal of forest products. If you employ an outside commercial man for advisory purposes, I cannot see what you are going to do with that commercial man if he wants promotion. If he was not under the forest service, don't you think that there is a chance of his position being abused?—A. Yes, possibly.

Q. Don't you think that chance would be greatly reduced if he was a recognised member of the forest service?—A. It is possible that it might lead to abuse, but I don't see why it should, more than with men belonging to the service and under the conservator. The commercial men would consider themselves forest servants just as much as the forest officers and would be under the orders of the Chief Conservator. As regards promotion it is a question of Government offering sufficiently good pay and prospects.

Q. Is this proposal your own or are you speaking with more or less certain knowledge of the ideas that are current in the Forest Department?—A. It is my own. I know there are a lot of officers who are against the proposal; they say it is putting the cart before the horse. I look on it as a link in the chain between the forest officer and the commercial world.

Q. Have you thought of this point of view, that the commercial side of forest trade might be sufficiently dealt with if you increased your forest staff, so as to be able to spare a man after five or ten years' service, in order to devote himself almost wholly to the commercial aspect of forestry?—A. It has come up repeatedly when considering local Forest Economists.

Q. Is it not a difficulty under the present system that, when a man becomes a Forest Economist, he is in danger of sacrificing his promotion to the higher grades of the department if he specialises too long?—A. Surely, I have thought of that myself.

Q. You think that an excellent Forest Economist might mean a good Inspector-General wasted?—A. That may be, but on the other hand the Forest Economist might be going back to forest routine work.

Q. Do you know the size of the staff they have in the corresponding section of forest economy in the United States?—A. They have from 80 to 90 men.

Q. You have the diagram showing the organisation of the staff. Do these 80 include the technical staff?—A. In his letter to me the Director said there were 40 or 44 experts, the rest being Museum Assistants, etc.

Q. They have 40 men of the kind that you would call efficient officers?—A. Yes.

Mr. C. E. Low.—Q. What was your own training?—A. I was for two years an engineer at Cooper's Hill working for a Public Works Department appointment. I was offered the forest and went over to the forest side, because my father was a forester before me.

Q. Have you had any discussions with firms who have been wanting to take up forest products in order to develop industries?—A. Yes, on the question of pulp and treatment of sleepers.

Q. Did you find that they had been finding much difficulty in putting up money?—
A. No, the money question never came up; in fact they were quite happy about the question of raising the capital.

Q. Did that happy state of mind depend on receiving definitely reassuring reports from Government experts?—A. Partly that and partly by their carrying out their own tests. We suggested to them that they should carry out further tests and assure themselves that it was all right.

Q. Would you care to see a large firm coming in and taking up industries like pulp on the unsupported attestation of Government experts?—A. No, I should be very sorry if they did do so.

Q. You would feel distinctly nervous if the public put capital into things on that basis?—
A. It would rather depend upon the expert. I told them that I was not a pulp expert. I could give figures about cost of extraction but would be sorry to back what was done on a laboratory scale in the case of pulp. We indicated to them and they accepted the fact that further tests were required.

Q. They had these tests carried out in England?—A. They carried them out themselves here. There were tests carried out in England, but what they pinned their faith on was their own tests.

Q. You think that in the case of organised industries worked on somewhat technical lines, they must rely to a large extent on their own investigations?—A. As matters now stand, yes.

Q. Do you think it would be possible for Government to equip themselves in such a way as to render it unnecessary for firms to make their own investigations?—A. Practically so, if you get a large enough grant and employ experts, but, in the cases referred to above, we have had no experts, such as for instance in connection with the antiseptic treatment of timbers. I have dabbled in this subject but could not put myself up as an expert. It is impossible to be an expert in a dozen subjects. I can find out roughly what can be done and tell them so. I think if Government appointed real experts and we were to get suitable plant, we could put up a strong case, which would be quite reliable.

Q. How long have these rosin and turpentine pioneer factories been working?—
A. About 20 years. The Bhowali factory has within the last 5 or 8 years been considerably improved.

Q. Have the Government invited any one to take over any such factory?—A. No, on account of the Punjab and United Provinces competition. I believe the tan extract factory in Burma was put up for sale to anybody who would take it over.

Q. To what do you allude by the Punjab and United Provinces competition?—A. The crude resin is very expensive to collect in the Punjab. Anyone taking up the business in the United Provinces could kill the Punjab concern in a very short time.

Q. You say that forests would be instrumental in assisting certain industries. Apart from the match-making industry, which industries have been run on a successful commercial scale, with materials provided from Government forests?—A. Tea-boxes and bobbins. There is a factory near Calcutta running bobbins. Over a million tea-boxes are made a year from local wood, i.e., from *Tulla* and *Simal*. This quantity is not sufficient, however, to supply the demands of the entire trade.

Q. In the case of testing timber to ascertain its suitability for making matches and match-boxes, has any use been made of existing machinery in India to test such timber?—
A. Yes, many tests have been made. We tested a lot of timbers at Bareilly. We get satisfactory tests carried out under existing conditions. Bareilly is very good at this work.

Q. Supposing we had what would be a properly organised and scientific department, would the submission of samples to the Imperial Institute tend to become more or less frequent?—A. I should say it would entirely stop.

Q. You say you found them unsatisfactory in respect of establishing a commercial connection?—A. That is what we found.

Q. What is the reason of this special weakness of theirs in that respect?—A. They don't seem to care to disclose the name of the firm. What reason they have for this I cannot tell you.

Q. Perhaps they don't know it?—A. Oh, yes; they do.

Q. Have you had any experience of working through the Commercial Intelligence Branch of the Board of Trade?—A. None at all.

Q. Do you think that if you had a call on the services of the Commercial Intelligence Branch by the appointment of an Indian Trade Commissioner in London, you could get any help?—A. I think we might. The number of our reference home is very small because the timber that is exported is well known and finds a ready market. India absorbs practically all that we can put out of other timbers.

Q. Do you think the importation of Jarrah from Australia is economically sound from the forests point of view?—A. I don't think it matters how much is imported; we can always sell at good rates anything we put on the market.

Q. We are not wasting what we might otherwise sell?—A. In the way of, possibly, sleepers, but the demand is so great for many of these timbers that there is room for anything we can put on the market, and we can undercut Australian timber if we can get our timber out of the jungle.

Q. Would you consider it an argument against entrusting a Director of Industries with control of research that the Director of Industries might be impatient of the slow results of that work?—A. Certainly, that would be the case.

Q. You say you are against an Imperial Industrial Department. By an "Imperial" Department do you mean a department under the Government of India or a department of the Government of India?—A. A department under the Government of India.

Q. Whichever was the department of the Government of India concerned, whom should they look to for advice on questions regarding promotion of industries, in the same way as the Revenue and Agricultural Department of the Government of India look to the Inspector-General of Forests for advice?—A. For commercial or research work.

Q. For its industrial policy?—A. They will have to look to the Director of Industries very largely for their information on such subjects. The more they go to the local official the more reliable information they will get.

Q. Supposing it was a question like this; two provinces were entirely at variance both on facts and policy; whom would the Government of India ask for advice?—A. I should ask both of them; if you have another man between, it simply makes him a post office. Somebody has to make up his mind on the point at issue.

President.—Q. Is that what you call your Inspector-General?—A. Yes, though no doubt he deals very largely with working plans, he often passes on the opinions of others.

Mr. C. E. Low.—Q. He very often advises on the business aspect of reports from the Imperial Forest Institute?—A. Yes, he very probably has further knowledge enabling him to do so.

Q. You are aware, no doubt, that the development of industries under different local Governments has hitherto been very unequal in the extent to which it has gone?—A. It hardly comes within my province; I know nothing about it.

Q. I see you propose as a member of your expert staff a business man; do you consider that necessary if you have a commercial branch of your department?—A. I meant by a business man a man who will answer the small conundrums that come into the office. We have a great number of non-technical enquiries, and you require somebody to answer them. My time is now taken up in answering routine enquiries. What is wanted is a sort of general intelligence officer.

Q. With reference to what the President was asking you about forest commercial men, how would it do if you had your man with an ordinary technical forest training at home and you apprenticed him to some suitable commercial firm?—A. That would do very well. As long as he gets a training which our men do not at present get in commercial matters.

Q. You speak about the extraction of timber from the Himalayas as a problem in forest transport. Do you think the problem is capable of solution on a commercial basis?—A. I should say so; it is so in British Columbia.

Q. Is any practical commercial solution applicable to Himalayan forests generally?—A. Yes, I should say so. I think the timber could be got out. I might say that a forest expert from British Columbia saw the Himalaya and he expressed the opinion that similar difficulties had been overcome in British Columbia. That is what I base my opinion on.

Hon'ble Sir F. H. Stewart.—Q. In connection with these many problems, there is a great deal of correspondence, I suppose. Does it mostly go through you or through other officers?—A. Nearly all comes to me personally. I very often know the people, and they write to me personally.

Q. Then there would be no question of increasing the staff of other departments in similar proportion to what you recommend for the Economists?—A. No.

Q. You refer to the question of Simal wood for matches as being advised by a German match-making machinery firm. Was the reference to them made at your instance or by the firm who were ready to take up the industry?—A. I was not in charge and would not like to say how it came about that that wood was sent home. It was before I was at Dehra Dun.

Q. I think you have explained that the Forest Research Institute take no responsibility, but give the best information you have and advise people to pursue the matter further?—Yes, if the case is a doubtful one.

Q. With reference to your suggestion for a forest economic section do you think that would be necessary in all the provinces if you have your Central Economic Department properly organised?—A. I am certain of it. Take for instance the question of surveys which

enable one to increase our existing knowledge of outturn of any one product. This must be done by special local officers. The men in the Imperial Forest Research Institute can never expect such help from the local provincial officers who are too busy. I would have these special officers placed in such a position that they could go round to commercial men and say "we have got so much raw material for pulp, etc."—and so take that part of the work off the Research officer and thus give him time to do research work at the Forest Research Institute.

Q. Even then if you had an improved Economical Department, a Research Institute and also a Director of Industries, you don't think that would help?—A. The latter cannot on the face of it tell you or be expected to find out what is in the forest, so far away removed from his real sphere of action. He can help on the business side.

Q. Are there local Forest Economists at present?—A. No, except one in Burma who is called a Forest Research Officer, and who investigates both silvicultural and economic problems.

Q. About the recruitment of these staffs, do you think you could get them at the pay you are able to offer them?—A. I think you could. I could pick half a dozen men in India now, who would be eminently suitable, and who would be willing to accept such appointments.

Q. Simply because of their interest in that sort of life?—A. Possibly, and also on account of the shikar, etc. We had no difficulty in getting a manager at Bhawali. We went to Manipuri for him. He is an engineer and a common-sense man, who, I understand, answers very well.

Q. Even if you got your commercial man, do you think you could get your engineers, or would they have to be regular members of the forest service?—A. We would have to make them regular members of the Forest Department or we should have trouble. As regards engineers, Public Works Department men would be suitable only in some cases, while in others, such as, for the extraction of teak from the felling areas to the edge of a floating stream, I don't think a Public Works Department man would do. A man from Canada would be eminently suitable, and would probably answer far better than a local man for such purposes. It is a very special subject.

Q. Who deals with these sort of engineering problems now?—A. The Forest Officers try to, and sometimes succeed but they have not the time, and have therefore to go sketchily about the business.

Q. They have not had the necessary education?—A. No, I don't think so; 99 men in our department out of 100 will tell you the same thing.

Q. Is it true that imported timber obtains preference even in districts quite near the sources of indigenous timber?—A. That is a big question. If you put teak down, there is nothing in the world that would compete against it. Take Oregon pine, for instance; even that timber cannot compete with teak. You will find throughout Calcutta trade names for timbers which boom for a couple of years and then die out.

Q. You don't think it is on account of better organisation, or even made on account of the difficulties of transport which the indigenous forest product has to encounter?—A. Transport accounts for a great deal, as in the case of imported deal from Sweden which is cheaper than Himalayan conifer timbers; the latter being expensive to extract.

Q. Principally extraction?—A. Very largely, and also conversion when you have got it out. For instance, you have a Forest Officer in charge of saw-mill; he begins by not buying the right kind of plant, and when it comes to cutting he not infrequently saws his timber into unsuitable dimensions simply from want of experience. That is why I advocate the commercial man.

Q. These imported timbers come in the right sizes duly sized and marked?—A. Yes, otherwise no one would buy them.

Hon'ble Sir Fazlulhoy Currimbhoy.—Q. You say you are "in favour of either the part share capital system or Government pioneering in cases where the undertaking involves large initial capital." What do you mean by "large initial capital"—very big capital?—A. Yes, say twenty lakhs of rupees.

Q. Don't you think that if Government start a particular industry with very large capital, they would not be able to help firms with small capital?—A. My remarks were with reference to industries connected with forest products.

Q. Don't you think that if the Government gave some concessions to private firms, they would be able to start these industries?—A. They have not been able to do so up-to-date.

Q. Through what medium do you give your information to the public?—A. There are published Government reports, memoirs and pamphlets, of which a large number are distributed free.

Q. Then you want Government Directors to be appointed in cases where the Government gives direct financial assistance. Do you want these Directors to be experts?—A. When I wrote that, I was thinking of a joint bamboo pulp industry in Burma, which has not been started and which is acknowledged by many firms to be a good business. We have got to

get over this difficulty in some way, and it is proposed to do so by means of a joint share system in which Government must have some man to supervise their own interests. I don't think Government would care to hand the whole business over to the firm and trust them entirely.

Q. My question was as to whether you want the Government Director to look after the financial side, or be an expert?—A. No, the financial side only.

Q. Then about the Advisory Board. You are not in favour of it. I suppose your experience of such a Board is confined to the United Provinces?—A. To a certain extent. Why I don't like such a proposition is that the more official interference there is, the less likelihood of the thing going through.

Q. Suppose you have a Board upon which there are reliable members, and where you could get business men who would be of great assistance to the Director of Industries. Don't you think they would be very useful? We have got such a Board at present in Bombay?—A. I don't quite know enough about it to answer that question.

Q. You say "All Technological Research Institutes should be fitted into a general development scheme for the whole of India, controlled by an Imperial governing body." You want a new body to be created?—A. I am speaking entirely of research work. You will have to have a Board where there are many fields of research, to settle the programme of work.

Q. About a business man, do you think you want a business man out of the service, or a service man to be trained up just as Mr. Low suggests?—A. I would sooner have a man from outside the service put into it.

Q. Do you think he will come into the service unless he is paid very highly, because the forest service has its own grades and they have promotion. This man will not have advantage of this?—A. It can be done if he is put into the Forest Service, with equal position to a Forest officer.

Hon'ble Sir R. N. Mookerjee.—Q. Am I right in understanding that you are opposed to lending an expert to any firm?—A. Yes, unless there was very special business to lend him for. If you do so, it has to be settled later as to how much of that acquired information belongs to the firm and how much to Government. It is a very unsatisfactory way of getting out of the difficulty.

Q. In a place like India, if a firm finds difficulty about technical advice, how are they to get it?—A. They can write to the Research Institute and get the advice. It is inadvisable that they should get the loan of an expert, as his services should be exclusively used for general and not individual use.

Q. Even if the firm is willing to pay for his services?—A. Yes.

Q. In answer to Mr. Low you said, if necessary, you can undercut prices to prevent the import of certain wood into India. Am I to understand that you can charge any price you like to customers in India?—A. Forest produce is practically all sold by public auction.

Q. If I go to you to ask for certain woods, which might be used in place of teak, it appears from what you say that you have no system of charging but can charge any price you like?—A. We put up the wood to auction and it is sold according to the prices obtained.

Q. Then how can you undercut, when the royalty is fixed by Government?—A. Anybody can buy at the fixed royalty.

Q. Do you think it is conducive to the advancement of any business in connection with forestry in India that you are allowed to charge as you like?—A. We are selling a given produce and we can sell it for whatever we get for it. The local Governments have power to charge royalty on timber when not sold by public auction.

Q. But you said you can undercut; do you go to Government to allow you to reduce prices?—A. No, we don't, but we can do so.

Q. That is in your power?—A. Not in the power of the forest officers but of Government. Forest produce must be sold by public auction or at fixed royalty rates or sold by sealed tenders, but as a matter of fact you could undercut. I don't say that it is done, but you could do so. There is no definite rule as to what you should sell by public auction, or what at royalty rates.

Dr. E. Hopkinson.—Q. Do you consider that a general survey of certain Indian rivers ought to be made?—A. A survey was talked about in the case of a river in a division I was in and it would certainly be of great advantage. It was a river on the west coast.

Q. Assuming such a survey necessary, by whom would you propose it should be carried out?—A. If it was a survey for forest purposes, the forest officer should do it. We have done occasionally very sketchy surveys. A great deal of river survey work is done in Burma, but that is done by the teak firms. I know of one place where we could reduce extraction by one-half if we had a proper survey.

Q. I suppose it would be necessary for a general survey to have a special expert from Canada or the United States to be attached to the engineering side?—A. Surely that applies not only to streams but to rope-ways as well and other branches of forest engineering.

Q. Do you think that such particular work could be equally well carried out by a corps of engineers attached to some Imperial Department and not directly attached to the Forest Department?—A. I do not see why it should not.

Q. You don't consider it important that they should form an integral part of the Forest Department?—A. A *esprit de corps* would be engendered better were they classed with forest officers.

Q. In section X you give a list of certain industries, the enquiries about which are either completed or are in progress. When completed are the results published?—A. Yes, in the forest reports. A "memoir" is a very finished report and rarely issued. A "Forest Record" is a sort of interim report in which results are published about an enquiry which requires further investigation.

Q. Are reports published yearly?—A. No, there is considerable delay in issuing reports. I wrote my note on bamboo pulp in 1910 and it came out in 1912.

Q. When it is finally published, whose duty is it to see that it is circulated in suitable quarters?—A. There is a free distribution list, and attention is drawn to it in the papers by means of short notices reviewing it. I think it becomes fairly well known, if of any interest.

Q. All that is done within the department?—A. The Superintendent of Printing distributes it. He is given a list prepared by the Inspector General, and any additions which we often make or suggest are added.

Q. There is no sort of transference at that point to the Department of Commerce and Industry?—A. I am not sure on that point. I think they are distributed, and are advertised to a certain extent by that Department. They seem to find their way to the interested parties.

Q. And when the Forest Department has completed its enquiries and published the results, they have finished their duty?—A. They result in a crop of enquiries.

Q. I was going to say, except to answer enquiries?—A. Yes. If it is a "Record" the enquiry may be still going on. When we have come to a point where we think we ought to publish further information on the subject, we do so. We may be five years working on a subject. Then we go on to substantiate our facts until the final report in the form of a "memoir" is published. The pulp enquiry is still in progress, and we have already published three reports in "Record" form.

Q. The point I want to get at is, whether it is the business of the department, or the practice of the department to get the thing going after it has been proved?—A. Yes. I go and call round on the firms in various places, trying to get them to take up the business. Even before the enquiry is written I often go round and try to get people to start, at the same time explaining the position of affairs to them.

Q. That is done at the cost of a considerable portion of your time?—A. Surely.

Q. It might be done equally well by a less qualified person?—Surely, it does not want an expert to do so.

President.—Q. How long do you say it takes for your report to come out?—A. Certainly more than a year.

Q. Whose fault is that?—A. I don't think it is anybody's fault. Say the Inspector General is in Burma and I am in Madras. The report goes to be passed by the President, Forest Research Institute, and the Inspector General then backwards and forwards to the press. So many people have to see it before it goes through that one can write another report by the time it comes out, a much better one probably, because you have got much more information by the time the original report is issued by the Press.

(Witness subsequently forwarded the following note on the delay which occurs in the issue of forest publications.)

At the outset it seems necessary to explain the procedure followed which is as noted below:—

The author sends the manuscript together with the illustrations for reproduction to the President.

The President edits the manuscript, making necessary corrections when required, and then transmits it to Inspector General of Forests with his recommendations.

Inspector General of Forests returns it to the President with his orders.

It is then sent to Calcutta Press.

The first proof when received from the Press is checked in President's office (Publication Branch) and then sent to author for correction.

On its return from author it is again sent to Press for a clean proof, and the above process is repeated.

Sometimes it becomes necessary to call for a 3rd proof before the publication is passed for final printing.

Up to last year, the final proof used to be sent to Inspector General of Forests for his approval, but to obviate delay President has been authorized to pass the final print order.

The illustrations are generally done at the Roorkee Engineering College. In two instances, however, they were done in England, but owing to war, they were delayed, otherwise the final printing of a publication is seldom, if ever, delayed on account of non-receipt of illustrations in time.

In regard to publications issued during the two years 1915 and 1916, the following statement shows the average time taken in the passing of a publication through the various stages :—

Average Time.

	Institute.		Inspector General of Forests.		Press.	
	M.	Days.	M.	Days.	M.	Days.
(1) With the President in editing the manuscript . . .	0	9	0	20	...	...
(2) Inspector General of Forests . . .	0	11	...	...	...	...
(3) In President's Office (Publication Branch) (The Manuscript is sometimes returned to the author to note Inspector General of Forests' remarks and revise it in the light of those remarks).	...	...	...	...	...	...
(4) Preparing a galley proof . . .	1	22	...	...	1	14
(5) Checking the same in Publication Office and by the author.	...	...	...	...	...	...
(6) Preparing second proof . . .	0	6	...	...	1	12
(7) Checking the above in Publication Office . . .	0	22	...	...	0	23
(8) Preparing final proof . . .	0	...	...	...	...	...
(9) Checking the above in Publication Office and by the author.	...	...	0	9	...	...
(10) With Inspector General of Forests for final approval .	0	4	...	...	2	18
(11) Final proof returned to Press . . .	...	...	...	...	...	...
(12) Final printing and distribution . . .	...	...	...	...	...	...
The average total period in the issue of a publication thus comes to :—						
In Research Institute . . .	3	14	0	29	...	...
In Inspector-General of Forests' Office . . .	...	...	...	...	6	7
In Press . . .	...	...	...	...	...	...
TOTAL . . .	...	...	10 months and 20 days			

The delay in the Institute is due chiefly to Research Officers being on leave or on tour.

The time taken by the Press, especially in the final printing, may perhaps be considerably shortened.

It has been noticed that the Calcutta Press sometimes take two months in sending proofs of publications containing 6 to 10 pages only.

Mr. A. Chatterton.—Q. In answer to question 62 you say that you are in favour of the appointment of Directors of Industries in each province, and in the same paragraph you say that so far as he is concerned, the Forest Department would make no use of his services. You would rather have the forest commercial staff?—A. They would do entirely different work from what the Director of Industries would ever do. The commercial staff would actually have to sell timber, ascertain the market rates, what demand there was, etc., which would have nothing to do with the Director of Industries.

Q. That depends on what you make the functions of the Director of Industries; you have not defined what those functions are to be?—A. I did not intend that he was to be an executive officer, actually starting industries himself. He would do very much what the Director of Industries in the United Provinces does now.

Q. The general idea underlying the creation of such posts as Director of Industries is to afford advice and assistance to commercial people in dealing with the development of industries in the various provinces they are attached to, and if the Forest Department is excluded from the operations of the Director of Industries, it means to some extent the creation of a separate staff doing actually similar work?—A. I did not assume it being separate in any way. I said it was very advantageous that they should work in with the Director of Industries.

Q. If we assume that the Director of Industries will have fairly wide functions, and a certain amount of executive power, would it not be more convenient to the province if these commercial officers were attached to his staff and work in co-ordination with the Forest Department?—A. I am certain that if the Chief Conservators and the forest officers had to go to the Director of Industries to sell their timber, there would be continuous friction, and a very great hindrance to practical working.

Q. For instance, take section X, in which you give a large number of examples of industries which are being worked out; and take no. (XIX) in the same section: you say that "the introduction of improved methods of manufacturing charcoal and combining this industry with the preparation of Stockholm tar in pine areas and of wood-tar where broad leaf trees are utilized." Is it not a fact that the demand for charcoal would largely depend upon the operations of the Director of Industries?—A. Not in the least. Nine-tenths of the whole of the charcoal is made in the forest.

Q. Who is it made for?—A. A great deal is for local consumption round the forests; in some cases it goes down to Bombay or other cities, but the greater portion is absorbed round the forest.

Q. Would it not be of great advantage to the Forest Department in improving their reserved areas, if there was a much larger market for charcoal?—A. That is a big question, and it is impossible to answer it. The uses of charcoal vary from place to place. I could give you a dozen examples of different things for which charcoal is utilized. It would be advantageous to increase the output of charcoal in some forests, while it would be disastrous in others. We do not always look on the preparation of charcoal with happiness. For instance there is very little demand for charcoal from twisted *Chir*; though by manufacturing Stockholm tar in conjunction with *Chir* charcoal, an industry might be started.

Q. In nearly all cases where you publish memoirs or reports, on industries, would it not be the business of the Director of Industries to deal with them?—A. Yes, sometimes.

Q. If he had part of the staff intimately connected with commercial working in the Forest Department, he would be more likely to be in a position to make use of these researches?—A. If you look through the list of publications, I do not think you will find two that have directly to do with the Director of Industries.

Q. I don't suggest that the Director of Industries or his department should do this work, but when you have done the work and want to get at the commercial application of it, instead of doing it through your own commercial staff, would it not be better if you referred it to the Director of Industries?—A. The Director of Industries could help us. He does so in the United Provinces, but the number of such cases compared to the whole is small.

Q. There are certain difficulties in certain commercial offices. We might get over those difficulties by attaching a commercial staff to the Director of Industries?—A. Then you create that gap I referred to before between the commercial staff and Forest Officer in practical working, and until you have your department behind you, the system suggested would be a failure.

Q. I have some experience of this, and find it works very satisfactorily. The Forest officer extracts the materials and in certain cases hands them over to other departments to deal with?—A. There you have a case where you have the Forest Department very much in control. The Chief Conservator of Burma is rather an independent man, with a very big department behind him. If you told him "You are not to sell any timber, we are going to let the Director of Industries handle the whole thing", I don't think it would work for very long. It might do in small places, but where the Forest department is of importance, I think there would be trouble. It would not be conducive to good work.

Q. In regard to these investigations how many experts have you got in the Forest Department?—A. We have got none; we have only got a pulp expert who gives us advice; a tan expert who is out temporarily, and a chemist who is an expert on certain subjects.

Q. How are these men entertained in the department?—A. The paper-pulp expert was originally employed by the United Provinces in their exhibition. He came on to us for two or three years on a fee, temporarily, and when he left he knew a great deal about the subject, especially about elephant grasses and bamboos. We thought it advisable to keep some sort of lien on him so that we might get further advice. When I went on leave he was still given a retaining fee and submits his reports and whenever we want anything tested, I send it to him.

Q. Is he attached to your office and subordinate to you?—A. No.

Q. To whom is he attached?—A. He is attached to the Forest Research Institute.

Q. With your experience of these matters, would you advise development of that system in obtaining temporary experts?—A. No, it is absolutely wrong. It answered its purpose up to now, but it is not the right way of doing it. You must have permanent experts and make it worth their while to stay.

Q. Supposing you have a permanent man; how is he going to get his training as an expert?—A. In the same way as any other expert. He has got to go through a certain amount of training at home, and if he has got practical experience all the better. The tan expert was with a tan extract manufacturer, and then he specialised on new products in the East, and certainly if there is an expert, he is one of them. He has had long experience in Borneo, at home, and in Cyprus.

Q. Can you recruit him in the ordinary course of recruitment of the Forest Department?—A. No, you cannot pick such men up easily. It has taken two years to find the right man, and the number is relatively limited. It is not the same thing as recruiting a big department. It is very difficult to make any rule about experts of that sort; they are nevertheless necessary.

Hon'ble Pandit M. M. Malaviya.—Q. You say, in the first paragraph of your note, that an arrangement of part share capital should only be undertaken in the event of no reliable company coming forward to undertake the business entirely on their own responsibility. When you have made your investigations into a particular industry, how do you publish the result?—A. They are published as a "Memoir" or "Record"; a forest publication.

Q. You do not put it in the Government Gazette?—A. I don't think it has been done up to now.

Q. Would you recommend that the Government should publish it to all Chambers of Commerce and public bodies?—A. Copies are sent to all Chambers of Commerce and public bodies; they are for free distribution.

Q. Do I understand you to say that it is only after giving these bodies time to consider whether they will take up the project that Government should pioneer it?—A. Yes, if they find that they cannot get anybody to take it up. In many of these instances I go round to likely people and suggest it to them. As a matter of fact throughout our forest experiences, we have to pioneer everything.

Q. You say, "of recent years the policy of Government has been to grant leases on favourable terms to companies for the extraction of raw forest produce, in connection with new industries, etc." Can you mention instances of some of these leases; for what purpose have these leases been granted?—A. For extraction of bamboos for paper pulp; for extraction of spruce for wood-pulp, etc.

Q. Have none of these leases been utilized?—A. Some of them; those connected with tea-boxes, spruce and bamboos have not as yet been worked.

Q. Was there a time limit in these leases?—A. The special conditions in connection with the war upset them. One cannot say definitely whether they would have been taken up or not, but possibly they might have been.

Q. You mention under the heading 'X—General,' certain industries in connection with which enquiries have been completed, and you mention the manufacture of paper among them. Is that one of the enquiries which have been completed so far as you are concerned?—A. No, we are at it still, but with bamboos we have done a good deal. Much still remains to be done as I told Mr. Chatterton. If we employed a man on pulp for 20 years, there would still be work for him to do. There are 107 species of bamboo in India, and we have tested four or five species, and one of those we have absolutely finished. We have demonstrated that one or two species of bamboo are suitable for pulp.

Q. Have you ever considered the question of utilising the husk of rice for the manufacture of paper?—A. It has been tried, but not by the Forest Department. Sugarcane has also been tried.

Q. Do you know with what result?—A. I could not say offhand. I think the results were fair though it is a complicated question. You can make paper out of anything if you care to spend the money, but it is not always a commercial proposition. So many factors have to be taken into consideration that it is very hard to say that one raw material is better than another.

Q. Are you aware that in Japan they make paper out of rice husk?—A. I was not aware of the fact. Do you mean white paper? I know they make brown.

Q. You say, "I am strongly in favour of Imperial scientific and technical departments for chemistry, botany, geology and zoology, etc." Would you place them all in one centre or will you have them in different centres?—A. It is rather beyond my scope. I have not given it very much consideration. I don't know much about it.

Q. In your opinion could any of these departments be suitably added to the Research Institute at Dehra Dun?—A. Botany might.

Q. You compare expenses in the Forest Department here with those incurred in the United States of America. Is the area under forest in the United States very much larger or is it about the same as here?—A. I don't know; the area under conservation may be bigger but they have enormous tracts where practically no minor forest products exist. It would be impossible to draw a comparison. What they might put down on paper as an area under forest would be very sketchy. I could not answer the question, but as far as management goes, we are far ahead of them. We start with reserving our forests and doing research work afterwards, whereas they did the opposite. They have developed their research work very largely, but are still very deficient in some of their protective measures.

Q. Have you compared their forest rules with yours?—A. No, I could not tell you anything on that subject, I have not studied the subject.

WITNESS No. 81.

Rev. J. A.
Graham.

Rev. J. A. GRAHAM, D.D., C.I.E., *Missionary of the Church of Scotland, and Honorary Superintendent, St. Andrew's Colonial Homes, Kalimpong, Bengal.*

WRITTEN EVIDENCE.

Notes on the home or cottage industries and on the working of the Kalimpong Mission Industrial School.

Kalimpong is the headquarters of the sub-division of that name in the Darjeeling District. The sub-division is a Government estate. There are no large land-owners and the policy is to maintain a *bona fide* crofter population of hill people holding the land direct from Government. The crofters are Nepalese, Lepchas and Bhutias—the Nepalese predominating. The population of the sub-division was 49,586 at last census. Kalimpong is on the high-way to Tibet and the centre of the Tibetan wool trade.

In 1905 the local Church of Scotland Mission began an industrial school with a view to the development of home industries among the crofters. The Mission had been established at Kalimpong since 1880 and had gradually established primary schools throughout the sub-division. The rapid growth of the population during late years and the dividing up of the land gave the economic suggestion for the industrial school while the difficulty of reaching the girls and women through the ordinary schools suggested for the women a combination of industries with the educational methods.

The industries represented—

Lace was the first department organised. The services of a thoroughly qualified teacher who had taught lace work in England was secured and from the first a *high standard* was adopted. This has been maintained and it is claimed that the lace made is equal to that of Europe.

Embroidery was soon added. At the beginning teachers were imported from Hooghly District of Bengal and from Lucknow. Subsidiary branches such as crochet and knitting, were also developed.

A weaving department followed. The Serampore loom, Salvation Army loom and Hattersley's hand looms have been introduced. Improved methods of reeling and warping have been adopted for *cotton weaving*. At the start women only were employed in the weaving but it has now been found advisable to train boy apprentices also.

The fact that Kalimpong is the trade centre for the wool trade from Tibet and the existence of a Tibetan industry naturally suggested the making of Tibetan rugs and carpets. The workers (women) employed in this department are Tibetans and Bhutias. It is intended (with the advent of an expert lady from Britain) to take up the manufacture of Tibetan tweeds after the style of the Harris tweeds made by the Scottish crofters. (These have already been made successfully in independent Sikkim).

Dyeing is a necessary accessory of the weaving school and with the exception of indigo and logwood all the dyes are obtained from local plants or trees.

The joiners employed in the districts were almost all Beharis and the carpentry school was started to train hill lads. It was begun in 1905. There is now a keen desire to take up carpentry and within a few years the supply of hill men should be sufficient for the ordinary work of the district.

This department grew out of the need of workers to make up articles for which lace, embroidery and crochet are required and now a large and rapidly increasing business is being done in household furnishings and ladies' garments. The apprentices are boys.

Silver work is encouraged and an effort is being made to utilise local designs and develop the Tibetan and Nepalese artistic models.

Turkey rearing was introduced into the district by the industrial school and now there is a considerable export of fat Christmas turkeys to Calcutta and other places, the arrangements being made by the school.

All the workers of the central school must attend literary classes as well as take part in the various industries. The women and girl workers (lace, embroidery, weaving and dyeing) go each morning for 1½ hours to the Mission Girls' Upper Primary School. In this way all become literate. Similarly the boy apprentices in the carpentry and carving, weaving and tailoring departments have 1½ hours book education in the middle of the day in a special school of their own. (It may be interesting to note that the pupils of the ordinary girls' upper primary school go, in their turn, to the industrial school for 1½ hours each morning to learn lace and embroidery.)

At the beginning, scholarships were given to women workers to encourage them to make a start with the industry. Now these are in but few cases required (except in cases of girls coming from a distance to study for a short time or in some special circumstance) payment is strictly for work done. The school supplies all materials and gives fixed rates. This applies also to boy apprentices in the tailoring and weaving departments whose apprenticeship lasts for 5 years. In the carpentry and carving school the period of apprenticeship for all boys is also 5 years. The boys in it begin with scholarships of Rs. 5 a month which is increased by 8 annas every 6 months. The school gives diplomas to boys at the end of their apprenticeship to satisfactory apprentices. The women workers get diplomas (junior, senior and teacher grades) whenever the excellence of their work warrants them.

The ultimate aim of the industrial school is to found cottage industries which will become indigenous to the district. The pupils who leave are encouraged to continue the work in their own houses, materials are supplied to them and they are paid for their work at the same rate as in school. The school takes the responsibility of selling the goods made.

A beginning has been made with branch lace and embroidery schools throughout the district. These are conducted by ex-pupils of the central school and are run on the same lines as to work, education and payment. The success of the few already established had led to the adoption by the Director of Public Instruction of a scheme for the founding of an industrial school for girls, as far as possible in connection with each primary school in the district. Girls' education is backward. The mass of parents will not spare their girls merely for book education but they are encouraged to do so when their girls can earn a little and

learn an industry while becoming literate. The women teachers who are now being trained at Kalimpong are consequently being prepared to teach an industry as well as in literary subjects.

ign pupils. The industrial school has received a considerable number of pupils from other parts of Bengal, from Bihar and Orissa and from Assam to be trained for industrial work in these provinces.

ocial arrange-
ts. The aim of the school is to make the various departments self-supporting as regards the industries themselves. This was not possible in the initial stages while the workers were raw and the experience limited but it can be claimed that the industries are now self-supporting as the statistics given below will show. The educational element in the school is naturally a charge to be borne by the school helped by a Government grant. All along an effort has been made to give a fair living wage to the workers and to charge accordingly for the goods produced. Had the school possessed a working capital the progress would have been quicker.

posal of goods. The goods are disposed of by (a) local sales, (b) sending boxes on approval to all parts of India, (c) sales of work in such centres as Darjeeling, Calcutta and Simla, (d) sales in Britain and the Colonies through private parties. As the industries grow, additional means will have to be used for the disposal of the goods.

Statistics for 1915-16.

	Lace.	Embroidery, etc.	Weaving.	Carpentry and carving.	Tailoring.
Central school workers . . .	101	44	63	57	17
Workers in own houses . . .	69	73			
Workers in out schools . . .	31	11			
TOTAL . . .	201	128	63	57	17

	Lace.	Embroidery and tailor- ing.	Weaving.	Carpentry and carv- ing.	Miscellaneous (Poultry, etc.).	Total.
	R	R	R	R	R	R
Receipts . . .	8,881	9,208	4,660	6,712	1,630	31,141
Expenditure . . .	9,391	10,697	5,211	5,726	1,100	32,125

Receipts and expenditure for actual industries, i.e., receipts for sales of goods and expenditure on materials and workers (neglecting all items such as Government grants and educational and organising salaries, etc.) was as follows :—

	Lace.	Embroidery and tailor- ing.	Weaving.	Carpentry and carv- ing.	Total.
	R	R	R	R	R
Receipts (actual sales) . . .	6,716	8,638	3,751	6,196	25,301
Expenditure (workers' wages and materials). . .	6,576	8,255	3,451	5,175	23,457

NOTE.—Stock in hand showed, in addition, increased values :—

Lace R336, embroidery, etc., R1,130, weaving R790, on the other hand the carpentry stock de creased in value by R243.

stage industries
Bengal.

The above sketch of the aim and work of the Kalimpong Mission Industrial School has been given as it is believed that something on the same lines might be carried on with advantage in many other parts of Bengal.

An industrial school can only be successful if it seeks to introduce or stimulate bona-fide industries and if it carries on its work on a sound commercial basis. The improvement and the developnent of already existing local industries (where there are such) would be the natural and probably the most satisfactory object of the school.

We consider the combination of literary and industrial education all important. At the present stage of female education, the combination is of special moment from an educational point of view.

The apprenticeship system for boys and the provision, at the expense of the industrial school, of literary education is the one to be adopted. At Kalimpong the apprentices in weaving and tailoring (who are paid by results even during apprenticeship) get an allowance of R1-8 a month to make up for their 1½ hours spent in acquiring the literary education. On the other hand they are fined if they do not take advantage of it.

There is a clamant need for organisation to encourage home industries in Bengal.—

In his review (page 6) of the industrial position and prospects in Bengal in 1908, Mr. J. G. Cumming wrote regarding the improvement in indigenous handicrafts :—

A Bengal home
industries associa-
tion.

"After six months special investigation, during which I have examined industries in twenty-six districts, it appears to me that what is now required is not the teaching of the existing methods in cottage industries, but the teaching of improved methods, and also the assistance of the educated upper-middle classes in a more organised system of production and distribution. Mechanical power or in some cases, an improved adaptation of human power is required. An acute observer, representing the United States Government, has recently reported to Washington that the *swadeshi* movement must recognise that this is the age of machinery all over the world. The artisan must not be left to himself to obtain his raw materials, to produce an article and then sell the completed product. Also I hold that industrial schools outside of a commercial atmosphere and without highly qualified teachers are futile, and that enthusiasm without money and business-like methods is vain."

Government can do much through the proposed Director of Industries, the Registrar of Co-operative Societies, Museum authorities, Schools of Art, and District Officers to encourage home industries.

What is wanted above all at the present time is a strong association for the promotion of home industries in Bengal with branches in every division if not indeed in every district. Such an association should unite the best Indians and Europeans in the province, should seek to create a living interest among well-to-do people in home industries, set the fashion in the use of their products, guide the producers as to the models they should follow, co-operate with Government officers in the organisation of the industries, advise as to financing, help with arrangements for the sale of goods by co-operative societies, private effort, sale depôts, etc., organise sale depôts in Calcutta and the larger towns and perhaps in Great Britain and the Colonies, encourage research on the subject of past, present or possible new industries, take steps to give full publicity to all information, hold stated meetings for lectures and discussions on subjects bearing upon the home industries of Bengal (the Arts might also be included), etc., etc.

Such recruitment of the well-to-do people of Bengal in the interests of home industries is to my mind an essential for any great development. I feel sure it would be successful at the present time and that a true *swadeshi* movement guided by the best Indian and European citizens would have a most beneficial effect.

To pay the salary of the necessary organising agent or agents (none but first-class men or women should be engaged) and to meet other expenses, a considerable sum would be needed, but I believe that ample funds would be forthcoming from patriotic citizens and from annual subscriptions from the numerous, widely distributed membership of the association. It would not be unreasonable to expect a yearly subsidy from Government.

My conviction of the value of such an association is based not only on the needs of Bengal as a whole but also on the increasing need of the Kalimpong Industrial School which would be greatly helped if the taste for its industries were encouraged among the people of India and a wider constituency were secured for its wares.

ORAL EVIDENCE, 28TH NOVEMBER 1916.

President.—Q. You have been very kind in giving us an account of what you have been doing at Kalimpong. I am not going to ask you any further details. But as you are dealing with questions connected with industrial schools I should like to know whether you have thought out the question as to how it would affect the young boys living in Bengal if they were sent to fairly large towns for industrial education. Are they likely to come back to their villages and take up their calling, or is it likely to upset their family connections to any serious extent?—A. I am afraid I have no personal experience whatever to guide me in giving an answer and anything I can say would be what I imagine would happen. We have no big centres with us such as you mention.

Q. You are really dealing with a very special class, are you not, people who do move about very freely?—A. They do.

Mr. C. E. Low.—Q. Towards the end of your note you propose an association for the promotion of the home industries of Bengal with branches all over the province. What would be their relations to the Director of Industries?—A. I should think it would be one of very close co-operation in the matter of bringing the people of the province more into touch with him for the carrying out of his suggestions.

Q. Supposing there was a difference of opinion whose views would prevail?—A. I should think the Director of Industries' would.

Q. Would they have any executive functions and budgetted funds of their own to dispose of independently?—A. I should hope so.

Q. And they will dispose of these funds on their own motion. I mean funds provided by Government?—A. I should think that Government should see its way to support them by a grant. But Government would have the whip hand by refusing the grant in case they felt that they did not use it carefully.

Q. For the purpose of propaganda work and the purchase of the products of these industries or the actual starting of new industries?—A. I should think that money would mostly be required by the association for propaganda work.

Q. For working up a market for the industries?—A. They would have a depôt or depôts which should be on a commercial basis and they would have the organisation to advertise this throughout the district and bring people into touch with them.

Q. Would you like the Director of Industries running it on his own account or would you leave it to the association?—A. I think the association would do it better than the Director of Industries as a whole. It would create popular interest.

Q. Do you think that an association of that sort will give a useful stimulus to bring out capital for small industries. I do not mean cottage industries. The Director might obtain the advice of the association to induce people to subscribe shares and so on?—A. I did not think of it from the point of view of any factory industry. The association would have on its conscience the development of the cottage industry side.

Q. You are no doubt aware that co-operative organisation and finance are likely to be very important for cottage industries. What would be the relations of this body towards the Registrar of Co-operative Credit Societies and his staff?—A. I should think that the co-operative banks might in many cases be used as branches of the association or the association would work through them. My own feeling is that this association would not have any kind of official position at all. It will try in every way to stimulate industries and it would work entirely in conjunction with the co-operative movement. The great object is to get in every district men who would feel their responsibility, think out what it might be possible to do, give help in pushing new industries or developing old ones. It will create a sentiment in the minds of the people.

Q. Do you think that interest could be elicited and sustained in the working of such a body?—A. I think so. Certainly if you had one or two enthusiastic men.

Honble Pandit M. M. Malaviya.—Q. How many boys and girls have you got in your industrial school, roughly?—A. We have 200 working at lace. 125 embroidery women and girls. 63 weaving, that is both men and girls.

Q. Do you receive any Government aid for the school?—A. We have hitherto received Rs265 a month. That recently has been increased with a view to enabling us to get an expert lady for weaving tweeds.

Q. Do you think the boys and the girls will be better able to benefit by the industrial teaching if they come to you after finishing their elementary education, or after you have put them through a course of elementary education in another school?—A. There is no doubt that it would be better if it were feasible. But at present we just seek to meet the conditions that we have there. Our present system seems to be the only possible way of doing it.

Q. But you think that it would be better if it were feasible?—A. I think it would be better if we had reached that stage of education.

Q. With regard to this association, suppose the Director of Industries was made a member of it and the association were left to decide as to the application of funds, would that not be better for promoting industries in the district where the association would work?—A. I should hope so.

Q. What I mean to ask is this. Would it not be better for the association to keep with itself the power of deciding in what directions they will work rather than leave the promotion of industries in the district to the Director who is at a distance?—A. I think it will be better if the association could have its own initiative. It would just be the hand-maid of the Director.

Q. There should be co-operation?—A. Success would depend on that.

Q. Is there any co-operative society in your district?—A. Yes.

Q. For what purpose?—A. For agricultural purposes at present.

Q. Not for industrial purposes?—A. No. But we shall have one for weaving shortly.

Q. If you had a co-operative society for industrial purposes that would greatly help industrial development?—A. I certainly think so. It is one of the great hopes of the future.

Mr. A. Chatterton.—Q. I understand that yours is rather a special kind of industrial school. It is only for the promotion of home industries?—A. Yes.

Q. What do you exactly mean by a home industry as compared with a cottage industry?—A. To my mind it is the same thing, home or village or cottage.

Q. You do not mean by a home industry an industry which is carried on in conjunction with some other industry in spare time?—A. That may be so. You have for example lace or embroidery. They have been done by people at home in their spare moments. They are also done by others who give their whole time to it.

Q. You do not distinguish between the two?—A. No.

Q. This association that you would like to see promoted is not exactly on the same footing as associations at home, such as the Irish Home Industries Association?—A. I think as far as it goes it will be on the same lines. I could imagine the association having a very much wider scope. But things are not so very developed in India.

Q. Here in India the cottage industry is enormously developed. Would you bring the whole of this great industry into the scope of the association?—*A.* In so far as the association thought it could do anything to develop and help it.

Q. Or would you confine the work of the association to popularising products, that is finding markets, etc.?—*A.* That would be an important part of the work. We would like to have meetings, discussions, etc., as well.

Q. Instead of including the whole of the cottage industries of Bengal, would you confine yourself to dealing with the particular class of industries that are taught at Kalimpong, that is lace, embroidery, etc.?—*A.* That would be a very small part of it. We first of all began with an idea of a lace association for Bengal. We have had a lot of pupils coming to Kalimpong sent by the various Missions and Municipal Boards and there is the difficulty of getting the things sold. So the thought of a wider association has grown up in our minds. If it is good in the case of lace why not do it for all? There is at present a spirit all over Bengal to foster the home industries.

Q. If the association starts with such a wide scope it may do very little. If you could have a more limited sphere you might do a great deal. How long has your school been in existence?—*A.* Since 1905.

Q. Have you any record of what has become of the pupils after they leave the school?—*A.* Yes. Take the lace school. They go out into their own homes and many of them continue the work when they go to the districts.

Q. When these girls get married do they still carry on the work?—*A.* Some drop out. Some carry on.

Q. With regard to the disposing of the goods is there not in England already an association or a depôt established by the Missions for the sale of its home-made goods?—*A.* I do not think it is very active now.

Q. Do you want to develop that idea of having a depôt in some place like London or wherever there is a large market?—*A.* I think that if the village industries or home industries of India (not only of Bengal) had a big depôt in London it would be a very good thing.

Q. That would be one of the functions which the association wants to work up to?—*A.* Yes.

Q. Have you made any attempt to get orders from commercial firms in connection with the manufacture of lace and embroidery?—*A.* Yes. Of course it pays better to have goods sold under private agency. As the industries grow we shall have to work more through commercial firms.

Q. The only other question that I wanted to ask you is with regard to what you say about the combination of literary and industrial education. You would not apply that to the education of artisans in industrial schools in other parts?—*A.* I have not very much experience outside our own district. My belief founded on our own experience is that if the apprentices have not passed through part of the elementary course, they can profitably combine literary and industrial education.

Q. Let us assume that they get education somehow. Is that not better?—*A.* Yes, if they have got it. But the greater number of artisans have had no education.

Q. At Kalimpong do you find any difficulty in carrying it on satisfactorily?—*A.* None.

Q. How much time do these boys attend?—*A.* 1½ hours during the day.

President.—Q. Would you like to make any supplementary statement especially with reference to this association? Would you expand that idea? Who will undertake the lead? It is a question of working out a practical scheme?—*A.* I believe it would be a good thing for the development of this association that the membership should involve with it a subscription and I believe we can get people who know the conditions of Bengal to co-operate. I do not think there will be any difficulty in getting a thousand men in Bengal who would contribute 5 or 10 Rs. a year. A smaller number who will give larger sums will become life members.

Mr. A. Chatterton.—Q. It appears important in some ways to devise a scheme of education for Anglo-Indian children which will raise them from their present depressed condition, especially among the lower classes of them. I understand that there are no Anglo-Indian children in your school?—*A.* It is entirely for hill people.

Q. You do not consider that these cottage industries and home industries would be suitable for Anglo-Indian girls. Would it be possible to put them on?—*A.* We are trying to get them as teachers. I do not think that the average Anglo-Indian girl would make anything like a living wage. For the Anglo-Indian boys, I believe apprenticeship is far the most useful avenue for them.

Q. Do these Anglo-Indian boys get into workshops as apprentices?—*A.* They get into railway workshops. We send them to Calcutta.

Q. You do not attempt to put your Anglo-Indian boys to a course of manual training or workshop practice?—*A.* Except in farming. We have sent some to New Zealand.

Q. Are many going?—*A.* We have sent 27.

WITNESS No. 82.

DR. P. C. ROY, *Director, Bengal Chemical and Pharmaceutical Works, Calcutta.*

WRITTEN EVIDENCE.

cottage
industries.

In India special attention should be given to the development of cottage industries. There are cottage industries which will stand the competition of factories. In fact there are many such industries in which no competition exists at all ; such as fine cotton and silk weaving, carpet weaving, pottery, carpentry and the artistic industries such as gold and silver work, ivory carving, metal inlaying, clay modelling, stone carving, lace making, lac work, etc.,—industries which still flourish in India. It is necessary, in the best interests of the country, to develop them by introducing labour-saving contrivances amongst the artisans and by offering them money at cheap rates of interest. For the latter purpose the spread of co-operative societies on the Raiffeisen model is needed. The village artisans will welcome any cheap machine or new process which will help their work. The only thing necessary is that the utility of the particular implement or machine should be demonstrated before them. The Commission should not neglect this important branch of industry, *viz.*, the cottage industry. The welfare of numberless people is bound up with the development of this branch of industry.

Government
stance.

The Government should help the development of industries by (a) the grant of financial and other aid to existing industries (b) by starting pioneer and demonstration industries.

The great object is to induce the people to become industrialists. The policy of abstention and aloofness of Government advocated by English economists will not do in India. The policy pursued in Japan ought to be followed.

The initiative of Government is justifiable when a particular tract is favourable to the starting of a new industry but the people from want of industrial skill and enterprise have not attempted it. The Government may also help an existing industry by suggesting new processes or new mechanical appliances of which the promoters of the industry are ignorant.

This policy was tried with success in Madras and the United Provinces. The aluminium industry in Madras and the sugar industry in the United Provinces are appropriate examples.

The silk, indigo, sugar and tea industries were all fostered by Government in British India.

It cannot be said that the policy of direct aid by Government is new. Some of the Native States have liberally helped private enterprises.

financial aid.

In giving financial aid the several methods suggested in question 5 should be kept in view. In several cases combination of two or three methods may be necessary. There cannot be one uniform method for all. Each particular industry will be helped according to its requirements.

The great principle in giving financial aid is that only the deserving industry should be helped. By deserving is meant an industry of which the promoters have studied the local conditions and shown considerable honesty and skill in the conduct of business and are in a position to make it successful by a timely aid. Aid to incompetent and ill-conceived ventures is to be discouraged. An industrial concern before it seeks for Government aid ought to show that it deserves it by its *bonâfides* and good management. The initiative should, as a rule, come from within and not from without.

Sometimes the only aid which a particular industry will require will be expert advice or arrangement for the supply of raw materials. The Match Factory at Tollygunge has no supply of wood for match. But the Government plantations in Darjeeling have got the kind of wood. Yet the factory does not get them in spite of repeated representations to the authorities.

The ways in which the Government may help an industry are numerous and do not consist merely of financial aid. The finding of a market for locally manufactured goods is one of them or the supply of an essential ingredient on favourable conditions as supply of alcohol to a pharmaceutical factory. It is a notorious fact that the nascent industries are greatly handicapped for want of a suitable market. The local traders demand high rates of commission and throw other obstacles in the way. They push the foreign manufactures of which the supply is abundant and try to force most unreasonable conditions on the home products.

It goes without saying that Government should exercise some control over industries which it helps. The least objectionable way is by an independent audit by Government and by periodical inspection. The appointment of Government Directors may cause friction.

pioneer factories.

Whenever a pioneer industry has been established on a good basis and there is offer of purchase by an individual or a private or public company, the Government should part with it. Preference should be given to companies. But it is desirable that the Government should exercise some supervision for some years after purchase.

The purchase may be effected on the annuity system, the Government retaining some control till the last annuity is paid. This system will not impose undue burden on the purchaser.

The Government should pioneer the following industries: lac, tobacco, sugar and chemical industries for the manufacture of glass, bleaching powder, alum, bichromate of potash, permanganate of potash, soda, etc.

The industries which can best be developed by co-operative societies are handicrafts Co-operative and small cottage industries and agriculture. The demonstration of the use of small machines societies. or of processes in home industries may well be tried by the co-operative societies with the help and guidance of Government officers.

The Government may avoid the highly organised industries as a jute or cloth mill. Limits of Government assistance But smaller industries and industries which are new to the place and will not compete with an existing industry ought to be taken in hand by the Government. This will not discourage private enterprise. For the latter may wait and purchase the Government concern or have an industry in co-operation with the Government. The demand for a particular product may be great and there may be room for many concerns of a similar nature. Suppose glass factories are started both by Government and a private company. The latter may manufacture the cheap articles and the former only try articles of a superior finish.

The Government should not hesitate to aid or start a new enterprise even if it competes with an established external foreign trade. For in that case no pioneer industry could be started in India, as there is a foreign trade in almost every article of ordinary use.

My province is at present in need of demonstration factories for the manufacture of Technical aid. glass, sugar, alcohol, tanning materials and leather and porcelain.

The Government should encourage the deputation of experts engaged in private enterprise to England and foreign countries to enable them to gain technical knowledge which they are in need of. It should be made a rule that in awarding scholarships for technical education preference should be given to those who are engaged in a particular industry or who have shown competence by possessing practical knowledge of the local industries.

The industrial schools are greatly handicapped for want of facilities in practical Industrial school training in factories. The Government should offer such facilities.

The industrial schools should be under the joint control of the Department of Industries and the Department of Public Instruction.

Our country is in need of night schools for the benefit of artisans.

There are private technical schools. The Government should properly recognise them and afford reasonable facilities wanted by them.

Industrial schools should be established all over the country. Besides arrangements should be made for manual training in the existing secondary schools. Students may be required to choose a career after some years of study. They should elect either to pursue their career in the ordinary secondary school or join an industrial school. It is no use having "B" standards in ordinary secondary schools.

The great defect of existing technical schools is the inadequacy of practical training. This can only be acquired in factories. Passed students of technical and industrial schools should be taken as apprentices in factories and workshops.

An advisory Board of Industries is preferable.

The Director of Industries, if one is appointed, should be a business man with general scientific and technical education. He need not be an expert in any particular industry. In no case should an executive officer having very little experience of business or industry be appointed to the post.

Official organisation.

The scientific and technical departments of the Government should be organised on liberal lines by which Indians may be benefited. Technical and scientific departments.

Qualified Indians find it difficult to enter these departments. Unless better facilities are offered for the admission of Indians who possess the necessary qualifications and are intimately acquainted with the needs and conditions of the country, the departments will not be of much help to the growth of industries amongst the people of the land.

The Institute of Science is located in a place quite out of touch with industries and beyond the pale of public opinion. There is no proper controlling authority. It is a matter of regret that vast sums of money have been lavishly and I would almost say recklessly spent, not commensurate with the real work taken in hand. But still it is premature to pass any opinion on its future. The technological researches on raw Indian products should always be carried out in laboratories established in Indian industrial centres as much time is lost in the transmission of raw products abroad and communication of results. Moreover this would have the effect of giving opportunities to Indians being trained under proper expert European supervision. Research Institutions have their great value in highly developed industrial countries. But in a backward country like India what is more required is the direct encouragement of industrial habits and enterprise amongst the people by the starting of pioneer and demonstration factories than by establishing highly developed technological research institutions.

Commercial
Intelligence.

General.

The Commercial Intelligence Department should publish monographs on industries and distribute them free of cost. The translation of these monographs in vernacular is desirable. It will be profitable to have a quarterly journal embodying these writings.

In order to give better facilities for the training and employment of Indians the workshops in connection with railways should be thrown open to them and Indians should be engaged as apprentices in higher engineering work. Dockyards might also be established in such ports as Bombay and Calcutta for the building of steamers, *e.g.*, navy. This will give an opportunity to Indian engineers being trained in naval architecture. This was the scheme adopted by Japan in the early stages of her renaissance in the seventies of the last century.

I should also suggest that some of the river courses in lower Bengal might be reserved for Indians for gaining experience in steamer navigation, *i.e.*, protected from competition by powerful European companies.

ORAL EVIDENCE, 28TH NOVEMBER 1916.

Mr. C. E. Low.—Q. You are Director of the Bengal Chemical and Pharmaceutical Works?—A. Yes.

Q. Is it a limited company?—A. Yes.

Q. What is the capital?—A. Five lakhs.

Q. How much is actually paid up?—A. Almost the whole amount is paid up.

Q. Your works are in Calcutta?—A. In the suburbs.

Q. Have you been a Director of it since it was started?—A. I have been connected with it from the beginning. It was started as a private enterprise and converted into a limited liability company some time in 1903. And as I am a Government servant I was not then in the directorate but of late I have been in it.

Q. What are the particular articles which you manufacture, speaking broadly?—A. Various kinds of medicines and acids and scientific instruments.

Q. With reference to the first part of your evidence, what do you consider should be the functions of the provincial Director of Industries in respect of cottage and organised industries, respectively. Do you think that the Provincial Director of Industries should deal with both?—A. Our people are so very poor and we have got so few industries worth the name that utmost efforts should be made not only to revive but keep alive these existing cottage industries.

Q. You point out the help which co-operative societies could give to cottage industries. Do you allude especially to credit or to purchase and distribution as well?—A. Both loans on favourable terms and also supply of raw materials.

Q. Do you think that sufficient money would be forthcoming to finance these co-operative industrial societies?—A. It depends on circumstances. If the products find a ready sale then of course money would be forthcoming. But if it is found that borrowers are unable to pay back their loans, then there will be difficulty as regards the flow of capital.

Q. That would depend firstly on the industries being properly selected and secondly on the members being properly selected?—A. Quite so.

Q. What should be the relations between the Director of Industries and the Registrar of Co-operative Societies?—A. That is very difficult to say off-hand. I have thought about that a good deal. But I am afraid I have not been able to come to a definite conclusion. I find there are departmental jealousies. One head of one department does not like the idea of his being interfered with by the head of another department. Harmonious working and smooth relations are not always easy to get at.

Q. Would you consider it a suitable solution if the Registrar of the Co-operative Societies dealt with the business side and the Director of Industries with the technical side?—A. I think that it would be a better solution and it would remove a good deal of friction.

Q. You speak of the match factory at Tollygunge suffering for want of wood and you say that the Government plantations at Darjeeling have the kind of wood required. Do you know about this personally?—A. I know a good deal about it.

Q. Is the wood at Darjeeling accessible?—A. I am afraid not. That is the difficulty.

Q. It is not the difficulty of price. It is only the question of transport?—A. It would be cheaper to get it from Australia than from these inaccessible hill regions.

Q. Leaving aside the cottage industries, with regard to what I may call the small factory, do you consider that, if technical advice could be given on the part of Government, if Government experts could examine the thing thoroughly and place before the public the results of those experiments showing the possibility of running the industry at a profit, capital would then be forthcoming to start such a concern?—A. I think our countrymen are beginning to realise that capital is no longer shy even in Bengal.

Q. Presumably capital would be more easily forthcoming locally in respect of small local factories?—A. Yes.

Q. I mean to say that the people of Rangpur would be more ready to subscribe to a tobacco factory in Rangpur than to some factory in Chittagong?—A. Yes.

Q. Do you think that fairly substantial amounts would be forthcoming?—A. I think so.

Q. When I say that Government experts would examine the thing, of course Government would not take any responsibility. They will advise to the best of their information?—A. Yes.

Q. Would you explain exactly what is meant by the B standards of secondary schools?—A. Sometimes these so-called technical schools are a misnomer. Sometimes a carpenter or a village smith is engaged and that is all the help that the boys are able to get.

Q. What is its equivalent in the ordinary course?—A. Side by side with the ordinary education we have the lower primary, the upper primary and then the secondary schools. The teaching is up to the matriculation examination.

Q. Do you know whether any of the B standard boys go on to the University afterwards?—A. Most of them go because they are not absorbed in any of the industries in this country.

Q. Is it regarded as an easier path to matriculation than the ordinary literary course?—A. I think that what is called the *bhadralog* or middle class feel a kind of repugnance to manual work but as competition is very keen, they are now taking kindly to such things.

Q. Returning again to the B standard, I understand it gives an industrial bent to ordinary education?—A. Yes.

Q. But generally both officials and non-officials consider that it is inefficient and unsatisfactory and leads to no good results?—A. If they are apprenticed to railway workshops or such firms as Burn and Co., and Martin and Co., I think it may lead to good results.

Q. Is there any difficulty in obtaining free entry into these firms for apprentices?—A. My impression is that it is somewhat difficult. For instance, the railway workshop at Jamalpur might give better facilities for the admission of students.

Q. Do they confine their apprenticeship to the sons of people already in the works or in what way are they restricted?—A. I think the average Bengali young man belonging to the higher classes has not the facilities that might be desired.

Q. Have you heard instances of such men having applied and their being refused?—A. I cannot tell that exactly. But that is the general impression.

Q. Do you consider that technical schools are capable of creating industries?—A. That is a very difficult question. In Bengal we are so very backward in commercial enterprises and business capacity that we cannot all on a sudden expect men from these technical schools to engineer big industries. They might be absorbed in industries which are already extant. But with only their help to start big industries would be a rather dangerous experiment.

Q. Do you think that industries should precede technical training?—A. They ought to.

Q. You say an Advisory Board of Industries is preferable. Preferable to what?—A. To a Director of Industries.

Q. By Advisory Board you do not mean executive board?—A. By Advisory Board I mean a board which has studied local conditions about the supply of raw materials and the demand for manufactured products and so on. They would start industries only after making the right kind of enquiries and experiments. For instance the match factory at Tollygunge. My view is that the experts should have taken ample care to see that the supply of timber was readily available on the spot. An Advisory Board would have helped in cases of this sort. They would have been able to warn the organisers that they were running a risk in starting the factory under the conditions. They would also advise as to the suitability of an industry to a particular locality.

Q. Who would constitute the board?—A. Men concerned with the Commercial Intelligence Department who could get the necessary information.

Q. People with expert knowledge, you mean?—A. Yes.

Q. Experts in industries and in business?—A. Yes.

Q. Who would control these various experts?—A. That is a difficult matter to pass an opinion upon.

Q. After all that is an administrative question on which perhaps you are not in a position to give an opinion off-hand. You say on page 2 "In a backward country like India what is more required is the direct encouragement of industrial habits and enterprise amongst the people by the starting of pioneer and demonstration factories than highly developed technological institutions." To what extent do you consider that factories were started without research?—A. I mean glass factories, for instance. There is also the aluminium works which was started in Madras under Mr. Chatterton's direction and advice. Such enterprises might be started.

Q. You think there is a substantial amount of industrial work and opportunity which could be made use of by means of knowledge in the possession of certain persons already, to be obtained for the purpose?—A. Yes.

Q. Take for instance the glass expert. He comes here from some other country. He finds some differences in the quality of the sand which leads to results different from what he has been led to anticipate from experience with materials apparently similar in the country from which he comes. We have all seen instances of failures of industries owing to that cause. How do you propose that this difficulty should be got over?—A. India is a vast country and the supply of raw materials can be secured from several provinces. The

Geological Department and the Commercial Intelligence Department could give very valuable information. I believe that at Titagarh the company failed because of the want of experts. Experts were brought out from Germany. They suffered from malaria and then went away. In such cases Government might come forward with the help of a fresh supply of experts. I have often observed with regret that the so-called experts have been instrumental in leading people astray. They come back from Japan and the United States with a superficial knowledge of the subject and they do not collect the necessary local information. They start the work and find out the difficulties in the way when it is too late.

Q. What is to be done to adapt the knowledge of experts who are not fully acquainted with local peculiarities, which means all the difference between success and failures. How is that small amount of very necessary knowledge to be obtained. You must have a certain amount of research facilities?—A. Suppose a glass factory is started. First the experts should see that sand, soda and coal are available near at hand. Of course soda we have to import for the present. I have known cases where a glass factory has been started far from the supply of coal and the carriage of coal has proved prohibitive. They should have taken care that the glass factory was initially located in a place where the supply of coal was the first consideration. I find often that they realise their mistakes when it is too late.

Q. In connection with the Bengal Chemical and Pharmaceutical Works, you were not able to start it without a good deal of research undertaken by yourself. Don't you think that has made a good deal of difference in the matter of the success of the company?—A. Work like this is based almost entirely on research, preliminary research work.

Q. I suppose you are still going on with your research work and are constantly trying to open out new lines of business?—A. We have a body of chemists, of whom one or two are entirely detailed off for research work.

Q. You generally direct the lines on which they should do research work with reference to what you consider commercially profitable business?—A. Yes. We are very keen about securing the best scientific men available. We do not take any one who is not an M. Sc. of the Calcutta University or who has not got knowledge of that Standard.

Q. You are in a position to find out whether a particular man is suitable?—A. It is left to me to decide. 99 per cent of our graduates are theoretical bookish men and one has to be very careful in selecting a proper person. He may score very high marks in the university examinations, he may get even a first class but he may be poor substitute in business. Whereas one who is a third class graduate may be very good as a business man.

Q. And therefore you say that the existence of a man with a scientific training in high control of an industrial concern is often a very great advantage?—A. Yes.

Q. Have you ever had any experience of the working of the commercial museum?—A. I know our firm is in frequent communication with it and often gets very valuable information.

Q. Supposing these commercial museums were made provincial, that is, to say, if similar museums were started in other provinces do you think it would be a useful advertising medium for Indian industries?—A. I think so.

Q. Do you think it would help you in the matter of sales?—A. Yes.

Hon'ble Pandit M. M. Malaviya.—Q. You say that it is necessary in the best interests of the country to develop these cottage industries by introducing labour-saving contrivances among the artisans. Would you recommend the lending of machinery on the hire purchase system?—A. Yes. That would be a very desirable thing.

Q. Then you say that demonstration factories would be of very great use? Would you have these demonstration factories only at the headquarters of the districts or also in the sub-divisions?—A. I would have them even in the remotest villages. For instance, take the extracting of juice from cane. The poor villagers have very crude ways of doing it. If a not very costly apparatus were brought to them and its use explained they would be the first to purchase it. Even, they would go into shares and purchase it.

Q. Do you think that there should be arrangement, made for making demonstrations from village to village or groups of villages all over the province?—A. Yes.

Q. It is a fact that the match factory applied for wood from Darjeeling but was not able to get it?—A. I think Mr. Mitter who has been cited as a witness will be able to give you better information about it than I can.

Q. You recommend that students who have passed through the technical and industrial schools should be taken as apprentices in factories and workshops and you recommend that Government should make it a rule that workshops and factories which are patronised by Government should take in a certain number of apprentices?—A. That is what I suggested in a note which I submitted to Mr. Swan. I quoted very largely from a book published in Japan by the Principal of the late Engineering College in Tokyo (Mr. Dyer). He says that in the seventies they sent out the first batch of students who came out of the engineering college to Sir William Armstrong, and they made a conditional order to the firms who made their battle-ships that no order would be placed with the firms unless they took in a certain number of apprentices. The Secretary of State commands vast influence and patronage and he might well afford to dictate terms to the firms so that a certain number of apprentices may be taken.

Q. You mean that the Government should arrange for it?—A. I feel very strongly on the subject. And my view is that Government has been rather backward in this respect.

Government might very easily arrange for it. They might say to the firms that no orders would be placed with them unless they took in a certain number of apprentices. That would bring them to their senses.

Q. You have seen the report of the Morison Committee. They have made a recommendation to the effect that the Secretary of State should exercise his moral influence to secure the object?—A. I should say not merely moral but direct influence. He can bring pressure to bear on the firms. He can afford to dictate terms. He need not go a-begging.

Q. Do you mean that unless he made it a stipulation they would not take in apprentices?—A. He commands huge influence and patronage. You know well how many millions worth of stores are bought through the India Office.

Q. You say that qualified Indians find it difficult to enter the scientific and technical departments of Government, and recommend that better facilities should be offered them. One of your recommendations is that such a difference as exists in the Indian Educational Service should not find a place there?—A. It should not. More of them should be taken in the scientific departments of Government like the Geological Survey and the Trigonometrical Survey. One reason why I say this is that other things being equal when an Englishman completes his 55th year, he retires, and all the technical and expert knowledge he gained in India is lost to India for good. Whereas if he were an Indian he would have resided in India and his expert knowledge would have been available to the Indians. Now I can illustrate this in my own case. I am about 55 and I am about to retire. If it pleases God to spare my life I would say that my advice would be absolutely at the disposal of my countrymen as long as I live. In the case of Europeans that knowledge is lost to the country.

Q. You say then that in these scientific and technical departments, which you recommend should be developed, Indians should have fair play?—A. Yes.

Q. You also say that Indians should be taken more and more as apprentices. Are not the students of the Sibpur Engineering College taken as apprentices in higher engineering? Are they not put through a course of practical training?—A. I think they are, suppose a bridge is constructed they are put on there. Sir R. N. Mookerjee would be able to give better information on the point.

Q. You say that research institutions have their great value in highly developed industrial countries. Did I understand you to say in answer to the President that you are not opposed to the higher kind of research?—A. I have spent the best years of my life in research and I should be the last man to decry it.

Q. You think that knowledge that is available in the matter of industries should be more widely diffused and utilised in the country in the promotion of enterprise and that research should accompany the growth of enterprise?—A. Yes.

Q. You have said that Bengal is industrially backward. Would you kindly let me know the reason for it? Bengal is not deficient in intelligence, and in every line of study that has been provided the Bengali has distinguished himself, in arts, law, engineering, medicine. Is not the industrial backwardness of Bengal due then to the fact that the system of education in vogue has been of an unindustrial kind so to say, that it is too literary and theoretical?—A. There are also other reasons such as the permanent settlement and the fertility of the soil.

Q. Do you think that if you had higher technological institutions and colleges of commerce to impart industrial and scientific education, there is no reason why the Bengali youth should not distinguish himself as well in these lines as in others?—A. Mere technological institutes will be of very little use. The Bengali have very little forwardness at present in the matter of commercial enterprises. On the Bombay side we have mill-owners who have never been in any technical or commercial institute.

Q. You recommend the establishment of industrial schools. Do you think that a general system of primary education should be the basis of industrial education?—A. It should be.

Q. Don't you think that the lack of general elementary education is a hindrance to industrial efficiency?—A. It is.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. Will you tell us why the chemical works of which you are a Director was exchanged from private ownership to a limited company?—A. We could command very little capital. To tell you the full history would be to repeat a chapter in my own biography.

Q. Was it not working profitably under private ownership?—A. It was working profitably. It was found that the proprietors could bring in very little capital.

Q. Is it working profitably now?—A. I think so.

Q. What dividends?—A. 8 per cent. The Directors want to give more but I am using my moral influence in restraining them.

Q. If new industries are started they require big chemical work and capital just like America?—A. Yes.

Q. Don't you think that they are first essential before we start many new industries?—A. Yes: take for instance the Sunlight Soap Company of Messrs. Lever Brothers. It commands a capital of 14 millions.

Q. You say you want grants from Government. In what way do you want grants?—
A. Loans at favourable rates of interest.

Q. Should Government guarantee interest on the capital?—A. Yes.

Q. You say that some of the Native States have liberally helped private enterprises. Can you cite an example?—A. I know the Mysore Government have helped the starting of a spinning company. They have purchased a few lakhs worth of shares and gave suitable land and in course of time these shares are sold to the public when the company was profitably working.

Q. You say that an industrial concern before it seeks Government aid should show its *bond fides* by its good management. Suppose a new concern is being started, how can they show their *bond fides*?—A. Take for example the great hydro-electric scheme. The bare name of the eminent directors would bring in any amount of capital.

Q. Do you think that in the beginning also Government should help?—A. In special cases, but one ought to be very careful.

Q. Then about the match factory you say that the other man will be able to give information?—A. Yes.

Q. You say that Government control over industries is best exercised by having an audit and periodical inspection. Suppose you had an auditor, do you think that is a proper control of Government? Don't you think that the Government should have their own directors?—
A. It may lead to friction.

Q. What friction can there be? He can only guard the interests of Government?—A. I agree with you there.

Q. You say whenever a pioneer industry is started and there is offer of purchase by a private individual, Government should part with it, and you say that preference should be given to companies. What companies do you refer to?—A. Something like the Aluminium works in Madras.

Q. You do not want private individuals?—A. It would be better if they were joint stock companies. An authorised syndicate should be formed. In the Bengal Chemical Company I have always been anxious to see that no man purchases a very large number of shares.

Q. You say that industrial schools should be under the joint control of the Education Department and the Director of Industries? Do you think that would work smoothly?—
A. It would then be able to command knowledge of a two-fold character. Of course dual control is to be avoided. The spheres of the control of the two departments should be clearly defined.

Q. You say that you are in favour of Government official journals and that they should be supplied gratis. Do you know what it will cost?—A. I mean at a nominal cost.

Q. You say that dockyards might be established. For building what?—A. Battleships.

Q. We want steel plates for it and we are not producing them at present?—A. In the meantime we have to import. I read a good deal about it in the case of Japan. If we were to wait for ourselves making the steel plates we shall have to wait indefinitely. In the case of Japan it cost her very much to build her own battleships. Recent events have confirmed and justified the wisdom of Japan.

Q. You say that if any industry is profitable, capital would be readily forthcoming. You know for example how successfully the jute mills are working. Why do not the Bengal capitalists put in their money?—A. I think that they are now opening their eyes to the matter.

Q. Do you think they will come out?—A. I know there is a middle class who are anxious to invest their money in the Bengal Chemical Works. They are small capitalists.

Q. Do you think that the permanent settlement is hampering industries?—A. I alluded to that as one of the economic reasons, as affording a sure source of investment.

Q. There is an association which is sending students to Japan and other countries. Do these men get employment on their return?—A. I suppose Mr. Jogindra Chandra Ghosh might be able to give you better information. I heard that they are getting some employment or other.

Hon'ble Sir R. N. Mookerjee.—Q. In the last sentence of paragraph 5 you say "It is desirable that Government should exercise some supervision for some years after purchase." Do you think that it will encourage anybody to come and purchase. When I purchase why should Government continue to supervise?—A. I meant until the money was all paid off.

Q. You clearly say that Government should continue the control after purchase for some years?—A. I meant only that it should be until the money has been paid off. After that nobody would like Government interference.

Q. If your suggestion that the Secretary of State should force firms to take apprentices is adopted, do you not think that indirectly we will have to pay for it?—A. When you order several millions of worth material the firm would readily oblige you.

Q. Would they not increase their rate?—A. There is so much competition as regards the supply of goods that they will not dare to do that.

Q. How many apprentices do you take in your own works?—A. We do not take any, we have many secrets in the chemical industry.

Q. In the same way the other firms will have their own secrets also?—A. The chemists' secrets are somewhat different from the ordinary secrets; if, however, Government were to guarantee the placing in of large orders for a number of years, I would gladly advise the taking in of a limited number of apprentices.

Q. You said that in your chemical industries you do not allow anybody to buy more than a few shares. Are the shares quoted in the market?—A. It has not been necessary to have them quoted in the market.

Dr. E. Hopkinson.—Q. You stated that the Japanese Government made it a condition that contracting firms should take Japanese apprentices. Do you think that the Japanese Government could make a similar condition to-day?—A. My point is that if you make large purchases from a firm they would always be ready to accommodate you.

Q. I ask you with reference to the particular instance of Japan. Do you think they could make such a condition to-day?—A. Possibly not.

Q. You think the Government of India would have no difficulty in making such a stipulation?—A. The Japanese Government is a foreign Government and when they got such terms my point is that we should be able to get better terms.

Q. Of what University are you a doctor?—A. Edinburgh, Calcutta and Durham Universities.

Q. For research work?—A. Yes.

Q. You have good opportunity of judging of the capacity of University students in connection with your chemical and pharmaceutical works?—A. Yes.

Q. You made a rather startling statement that 99 per cent. of the M. Sc. students of the Calcutta University were too bookish to be of any value for ordinary business avocations?—A. They are good for research work but they are no good for business and commercial work.

Q. What do you attribute that to?—A. In Bengal there has been a kind of hereditary repugnance to taking to trade and commerce. We have always been notorious for choosing the clerical line, the law and the professions.

Q. And then in the course of your evidence you press the point that there should be manual training in the secondary schools. No doubt if it became universal it would go a long way towards correcting the tendency that you suggest. Would you not carry that manual training back to primary education?—A. Yes. That would be the best possible way.

Q. So that you would insist on manual training at the same time that the boy learns to read and write?—A. I should very much like it.

Q. Have you worked out a scheme?—A. At first in the kindergarten system they would make gardens and learn the use of the spade. Then they will learn basket making, etc.

Q. So you would devote some of the time now given to reading and writing to manual work?—A. Yes.

Q. And you think that it is quite feasible?—A. Yes, especially in the villages in Bengal.

Q. Then I suppose when they have advanced to secondary education manual training might take a somewhat higher form, e.g., carpentry, directly in connection with some industry?—A. Yes.

Q. The two things might then go on together?—A. Yes.

Q. Can you tell us exactly what the B standard is?—A. At present what is meant by technical schools in the places outside Calcutta means no more than securing the services of a carpenter and a blacksmith. That is the only help they get and they are spoken of as technical schools. That is not what is wanted. The B standard will give an industrial bent to education, I mean to general education.

Q. If primary education is associated with manual training that could be carried to the secondary school and up to the time when a student goes to the University and this would more than anything else correct the present state of things which you deplore?—A. Yes.

Mr. A. Chatterton.—Q. Are the methods that you advocate in your written evidence those which you have pursued in so far as it was possible in developing a very successful chemical industry?—A. Yes.

Q. You did not apply for any Government assistance?—A. Never.

Q. You have had no financial aid of any kind from Government?—A. We never asked for it.

Q. You began on a small scale and gradually built up?—A. We proceeded step by step.

Q. Don't you think that other people also could do the same sort of thing when they wish to start an industry?—A. It has taken us nearly quarter of a century to make this progress. Now-a-days it is very necessary to start with a very big capital and secure the best possible experts if we are to compete with foreign markets.

Q. How many chemists have you got in your employ?—A. Four chemists in the higher department.

Q. How many altogether?—A. There are a number of people who make preparations like compounders and foremen. Four are M. Sc.s of the Calcutta University. My services also are at their disposal.

Q. Have you got any experience of students who have returned from Europe or America who were sent there by Government as technical scholars?—A. Yes.

Q. Do you think that it is a satisfactory system?—A. I have suggested that those who have already been in business and have done some kind of work at home could be selected to go to Europe and learn the advanced methods. At present they are sending men indiscriminately.

Q. Have you visited the Indian Institute of Science in Bangalore?—A. I have recently been to Bangalore. I am a visitor appointed by the Calcutta University.

Q. You say there is no proper controlling authority. With reference to what?—A. I have found that up till now 39 lakhs of rupees have been spent.

Q. Is that accurate?—A. That is what I saw in the papers and the central block cost 6 to 7 lakhs of rupees. Even the Director or the professoriate could not tell me what it is meant for. Seven lakhs for a block which is scarcely wanted and for which nobody would like to be held responsible! The money has been recklessly spent.

Q. Whom did you get this information from?—A. The Director and the professoriate. They could not give me any satisfactory information. There is a big clock tower in the central building which is meant to locate the library. There are some halls as big as those in the Buckingham Palace.

Q. All this information that you have got is not strictly accurate. That is why I should like you to modify your statement to some extent?—A. That was the universal complaint that I heard from the people of Madras and Bombay.

Q. When you want to make a statement of this kind why did you not go to the Director and get the information?—A. I have seen it published in the public papers. I got reports that up till now 39 lakhs of rupees have been spent in block and building and also in current expenses.

Q. You are mixing up two very different things. It is 21 lakhs. Would you not therefore withdraw that sentence. Whatever mistakes there may have been in the past things are on a better basis now and presumably there is some controlling authority at the present moment?—A. I am strongly of opinion that the constitution of the committee ought to be changed. Because the outside public have no voice in the matter. The professoriate and the Director are in the overwhelming majority and they can carry on things in their own way and I believe even the donors have no hand in the matter.

Q. You object to the location of the Institute of Science in Bangalore. Have you got any accurate knowledge of the amount of industrial work going on in the neighbourhood of Bangalore?—A. I have seen the harnessing of the Cauvery and the Kolar Gold fields. That represents a huge industrial enterprise. There are weaving, spinning and woollen mills.

Q. Do you still adhere to your opinion that it is an unsatisfactory place in which to locate an industrial research institute?—A. I mean it is so far away.

Q. It is of course a long way from Bengal but is it far away from the centres of industry in the south of India?—A. It is nearer Madras. I fully admit. Possibly it is of great advantage to the Government of Mysore.

Q. Your complaint then is this that the Institute has not been of much use to Bengal. It may be of use to the south of India?—A. I do not know whether it has been of much use to Bombay, which claims some of the biggest donors.

Q. From this I understand that you would recommend the creation of a number of similar institutes in other parts of India, in the large industrial centres?—A. It all depends, as I said. We are yet in the premature stages to pass any decided opinion. I have said nothing against the personnel of the Institute.

Q. I am not now talking of the Indian Institute of Science and your opinion of it. I am asking you whether you are in favour of having similar institutes in Calcutta worked on proper lines.—A. We have got centres of research in Calcutta and do not think a separate institute would be of much use. In the Presidency College and the University College of Science we have got researches going on.

Q. Then you have got researches sufficiently developed?—A. So far as chemistry is concerned, we have got ample facilities.

Q. Are these researches in Calcutta devoted to the prosecution of what I may call pure science or the application of science?—A. It is for pure science.

Q. Has any research work been done in connection with the application of science?—A. Not at all.

Q. Do you want any help provided for Calcutta?—A. It would be useful for local institutions. If one wants to have some information connected with any industry in Bengal it would be inconvenient to go to Bangalore. Moreover they would be overwhelmed with work from the various provinces of India, each province sending in its own peculiarities.

Q. Would you be in favour of the development of central research laboratories for the prosecution of these enquiries in India or do you want to have them locally?—A. I should like

to have local centres. Because it is the particular locality that would determine the conditions of work in that locality. Mr. S. Deb.

Q. Do you want to have these scientific centres under provincial or Imperial control?—

A. I should have provincial control.

Mr. C. E. Low.—Q. Do you propose to have one in each of the provinces or in each of the major provinces?—A. One for each of the provinces, one for Bengal, one for the United Provinces, one for the Madras and so on.

Q. You do not propose to have one for Delhi?—A. No. The smaller provinces could apply for help to the major provinces.

Q. You would allow the smaller provinces to have access to the larger provinces?—A. Yes.

Q. Have you anything to add to the remarks you have made?—A. We have been very unfortunate in the selection of our industries. And before any new industry is started it should be impressed upon the would-be organisers that they should take sufficient precautions to enquire as to the supply of raw materials and the scope of the sale of the articles and so on. In this connection to which I have referred, the organisers might as well have enquired where they were likely to get their wood. Many industries have been taken up, for instance, soap making. I find that the very important thing necessary, namely soda, has to be imported and then there is the glycerine which is a bye-product. In European countries it is the glycerine which keeps up the soap industry. We throw it away. Unless we start on a big scale we cannot recover the glycerine. It requires a big plant. At present to throw away the glycerine and to make the soap would be an impossible undertaking. The few industries that are surviving are able to keep on because patriotism pays a kind of bounty as it were.

WITNESS No. 83.

MR. S. DEB, *Manager, Calcutta Pottery Works, Calcutta.*

WRITTEN EVIDENCE.

In my opinion, there is no dearth of capital in Bengal; but the people generally invest Capital. their money in land which they think the best and the safest investment. Now-a-days the money-lending business, under proper security, is drawing and engaging a large amount of capital in Bengal. I cannot say that the money cannot be found to finance industries. The tea industry for example never lacks capital, because the industry is considered safe, and the profit accrued therefrom is very tempting. The first tea concern was started in 1840, and in the course of less than 45 years area under tea rose about a million bighas. From 1885—1913 it has doubled its area and the aggregate paid up capital of 98 companies, registered in India, amounts to 3 crores of rupees and the gardens employing more than 100,000 persons.

Thus when faith has once been created in an industry as to its safety and prospects, capital is never lacking. Over capitalization has frequently happened in many cases. To cite the example of the oil mill industry of Calcutta, seeing the prospects of the first few oil mills, turning out edible oils mainly, nearly 80 mills with a total invested capital of Rs. 1,20,00,000 approximately, have cropped up in an area of about four square miles within the last 20 years. Now the total output of edible oils, if all the mills are fully worked, is far more than the local consumption, hence the mills are obliged to shorten their hours of work.

Faith in the promoters had led to the establishment of various other industries also. The name of Messrs. Tata & Sons has led to the foundation of the Iron and Steel Works at Sakchi. The Hydro-Electric Works initiated by the said company have proved successful and also the cotton mills they have promoted.

In Calcutta, capital was never lacking for the various railway companies which have been started, since they have been promoted by companies, who command a good deal of public faith.

The faith, which is an essential factor in the industrial development of Bengal, is badly wanting now-a-days, so far as the promotion of joint-stock companies by the people are concerned. Causes of failure of joint-stock enterprises in Bengal.

I entirely agree with Mr. Swan, when he says in his report, that the causes of failure of joint-stock enterprises in Bengal are principally due to—

- (1) insufficient capital and
- (2) inefficient management,

but the question is deeper than that, for whenever any successful industry has been founded on a large scale in any civilized country, involving large capital and on a sound basis, there must have been a large amount of forethought.

The promoters of a company have to be really efficient men who know their business and they must go through every question of detail, not only in the process of manufacture, but in the selection and choice of raw materials, the market where they are purchased, the competition which it has to confront, the advantages and disadvantages of the proposed company

over its competitors in the disposal of their products and several other questions, before an industry is started. If these are properly investigated and the promoters are really satisfied that such an industry should be established since it has got its advantages over its rivals, the question of deficiency of capital cannot be raised at all.

The directors and promoters of so-called industries here have been all more or less professional men, who may have great abilities and eminence in their own profession, but they had neither the opportunity nor the inclination of gaining experience in business methods and finance. With the cares and anxieties of their own profession they naturally cannot consider this new adoption of theirs as anything very serious and the result is inevitable failure. The management and directorship of industrial concerns require years of training and whole-hearted concentration, but these directors considered that the attendance of a few hours snatched from their professions is enough to run an industrial concern successfully. Before the Tata Iron and Steel Works at Sakchi have been actually started, years were spent in preliminary enquiries. The industrial activity of recent years is in my opinion not a proper and healthy attempt at industrial development, but it serves as a great experience, which has always been the case in the early stages of industrial development all over the world. When this effervescence subsides, the true state of affairs will be perceived and right methods will be adopted.

The only way to start and develop industries seems to be by private enterprise. But such enterprises are very few and limited. No industrial development of a country is possible in that way. Very few have got that spirit of enterprise and purse to initiate new industries and sustain them till they are profitable and finance them for adequate expansion so as to compete favourably with foreign rivals who, employing larger capital and with more business facilities and taking advantage of the open-door policy of India, can dump their goods in India and stifle the infant industry. For example, I may mention the industry in which I am engaged. It was a trial, both for the capitalists and for the expert. The capitalists had to wait very long nearly for fifteen years, without any sign of profit, and the expert, for years together, had to put forth every possible exertion to save the infant industry from destruction by foreign competition. There are few to court such troubles and anxieties at his own cost. A few industries that have been initiated by private enterprise, have shown signs of success. I may mention chiefly among them the Calcutta Pottery Works, the National Tannery of Dr. N. R. Sarkar and the Bengal Galvanizing Works of Messrs. P. N. Dutt & Co.

The funds and capabilities of private enterprises are limited. India is mainly exporting to other foreign countries her produce to the extent of nearly £100,000,000 annually. If she has got to make her own manufactures, she has got to stand in competition with factory people with huge capital and organisation, and nothing short of a joint-stock concern, commanding big capital, can accomplish this. To give the first start, to investigate properly the various conditions, to create faith in the people regarding the successful working of an industry, Government must take the initiative. As it has done the pioneering business in some industries, it ought to come forward for others also. To cite an example, I refer to Sir George Watt's book—'The Commercial Products of India'—in which he writes, "It is not known how much money the Government of India actually spent from first to last in their efforts to ingraft the tea industry of India, but it would appear that Gordon's mission to China and the expenditure of the Indian Tea Commission came to close on £18,000. If we assume that sum to have represented but one quarter of the total expenditure actually incurred, the result might still in perfect fairness be characterised as one of the most profitable undertakings of the administration of the Empire of India." Japan did the very same thing as we find in Count Okuma's book—'Fifty Years of New Japan,' where it is stated that "The Imperial Government took every step necessary for the encouragement of new industries. Model factories were established at considerable expense, samples were brought from foreign countries to serve as samples for Japanese industries, and were also loaned, on application, to the prefectural governments. A meeting of manufacturers was held in order to ventilate the opinions of persons engaged in industry, and regulation for trade associations were issued with the object of harmonising industrial pursuits and promoting their interests. The system of credit mobilier was inaugurated for the benefit of new enterprises, and spinning mills established by the Government in Aichi and Hiroshima prefectures, were subsequently sold to the public in order to encourage the development of that industry. The Government induced prefectures to organize local industrial joint exhibitions from time to time, expert judges being commissioned by the central Government in order to encourage material development. Such measures had the effect of rapidly promoting industries which had been inaugurated in the early years of Meiji." The first stage of the development should be done by Government till it is assured that industry is feasible here profitably, then it can hand over to concerns who would evidently be eager to undertake it. Departmental monographs, quite interesting in their own way, are only of value to the man who is actually in the industry; they can never create eagerness in others to start an industry. Hence it is, that all Government monographs are a sealed book to 99 per cent. of the reading public. If a dozen industries under Government auspices prove to be successful, confidence will be created in the minds of the people who will get an opportunity of seeing what capital and organisation mean in the success of an industry. Honest and sound promoters will come forward to start industries with limited liability and good investors will not be wanting to finance the enterprises.

I suggest that the best ways by which the Government can help the development of industries are by :—

- (1) starting "pioneer factories" for new industries,
- (2) helping existing industries,
- (3) establishing a Central Technological Institute with a commercial museum attached to it in Bengal,

where the best brains of the land might be employed to solve not questions of academic interests but questions actually to be solved in industries.

I would suggest the establishment of a 'pioneer factory' for glass manufacture in the Pioneer factory beginning.

The total value of glass and glassware imported into India in the year ending 31st March 1914 was £1,296,853 and the figures show that imports under this head have increased steadily in recent years.

Few glass factories started with in recent years have had successful results. The unsuitability of the soil and its inhabitants and various other causes have been attributed to their failure. But in my opinion no thorough investigation in this matter has been gone into as it ought to be considering the magnitude of the industry. The various countries producing glass, the nature and quality of materials they use, the most up-to-date methods they employ, the capital they invest, the outturn they secure, the market they command, the intermediary through which these markets are secured, their competitors and the advantages and disadvantages of each class of goods, are matters to be carefully gone into. We should investigate thoroughly the conditions how, within the short space of four years, Japan could send to the Indian market from Rs. 8 lakhs to 25 lakhs worth of glass articles; wherein lay her speciality, what has made her so efficient as a manufacturer of glass, are matters requiring serious attention before any attempt is made to start any glass works here. The United States of America undertook to manufacture glass in the early nineties, and it is now a success. There must be many lessons to be learnt from these preliminary investigations which would save much time, energy and money. In the circumstances I would suggest that the Government, before it starts the pioneer industry, should send a competent person to the various glass manufacturing centres of the world, with special attention to those countries where the industry has been recently successfully started. Fortified with this information and all the data necessary for the purpose and applying conditions suitable to the country the factory would be just the sort of a model required.

Regarding the second suggestion of helping existing industries the following methods of Government giving Government aid are in my opinion practicable :—

- (1) guaranteed dividends for a limited period, with or without subsequent refund to Government of the expenditure incurred in paying dividends at the guaranteed rate,
- (2) loans, with or without interest,
- (3) supply of machinery and plant on the hire purchase system—generally for the development of home or cottage industries,
- (4) guaranteed Government purchase of products for limited periods,

and the selection of any method (one or more at a time if necessary) will depend on the nature of the industry to be helped. But in all cases the industries should have banking facilities so that they may get money from the bank at small rates of interest with proper security.

I think it is proper and necessary for the Government to keep a control over the industries which they will help. The best control will be to keep a Government director, as in the case of guaranteed railways on the board if the industry is a joint-stock company; if it is a private enterprise regular inspection by suitable Government officers and auditing of accounts by Government auditors, as in the case of co-operative credit societies, will be necessary.

Some industries exist in Bengal and a fair amount of work has already been done towards their development. I recommend Government aid to such industries.

The industries which I know and should be helped are as follows :—1. Tanning industry. 2. Chemical industry. 3. Match industry. 4. Porcelain and earthenware. 5. Pencil-making industry.

As the success of these industries is practically assured and a great deal of uphill work has already been done by private enterprise, the Government can very easily understand their positions if proper investigations are made.

My third suggestion is the establishment of a Central Technological Institute with a commercial museum attached to it in Bengal. These institutions, established in different parts of the country, have been the main factor in developing the industries of Japan. I have had the good fortune of working in one of these institutions during my stay in Japan in 1904 and 1909 and I write this from my own experience. The functions of these institutions are vast and varied and they may be classified as follows :—

1. To gather information of the available resources of the country—agricultural, forest, mineral, etc.,—suited for industrial development. They should be arranged and classified

properly to suit various industries in which they may be utilized and thus forming the nucleus of an economic products museum.

2. To carry out exhaustive researches on raw materials available in the country with a view to manufacture finished products as imported in the country and place results of such researches at the disposal of the public.

3. To find out by experiment if it is possible to manufacture a certain article imported in large quantities in this country, out of raw materials available here.

On this subject I have got practical experience at the Porcelain Testing Laboratory at Kyoto (Japan) which would be of interest to the Commission. There exists a class of earthenware in England called the "Ironstone China" chiefly manufactured by Messrs. Johnson Bros., Ltd., of Hanley. The import of "Ironstone China" plates and dishes rose very considerably in Japan in 1905, in spite of heavy freights and a high tariff and within a short time they replaced Japan-made porcelain plates and dishes in the hotels and restaurants. The Government took up the matter and reported the fact to the Director of the Laboratory. Experiments in manufacturing "Ironstone China" out of Japanese raw materials began in earnest. We were given dozens of 'Ironstone China' plates to break and scrape the thin layer of glaze on them; compositions of 'Ironstone China' body and glaze were found out by analysis, suitable indigenous raw materials were selected and "Ironstone China" was manufactured in the laboratory. I remember a pottery manufacturer in Nagoya, named Matsumura, who took up this new line. When I revisited Japan in 1909 the factory was in a very prosperous condition and I could not find Johnson Bros.' "Ironstone China" any more there. Now the "Nippon Koshitsu Toki Kaisha" (Japan Ironstone China Manufacturing Co.) working at Kanazawa with a capital of more than 15 lakhs of rupees, is turning out huge quantities of Ironstone China of different kinds. The Calcutta market is flooded with their manufactures and their quality can be best judged from the samples I have supplied to the commercial museum as exhibits.

4. To issue regular reports of the results of all researches carried out in the Institute and to publish monthly a journal dealing with topics of industrial interest and containing reports of researches in other provinces of India or abroad. I would suggest the publication of a vernacular edition of this journal

5. To allow competent persons interested in any industry to investigate and carry on special researches on their own lines in the laboratories of the Institute and to use the machineries of the workshop for his purpose. The scope of his researches should be enquired into at the beginning and if found practicable he would be admitted free or on payment of a fee. I have had experience of such a laboratory in Berlin (Chemisches Laboratorium für Tonindustrie. Prof. Dr. H. Seger & E. Cramer G. m. b. H) where I carried out special researches on the manufacture of electrical and chemical porcelain with raw materials which I took from here. I had to pay a fee of Mk. 250 a month.

6. To help manufacturers in solving their technical difficulties and also to help intending manufacturers by selecting suitable raw materials, machinery, etc., or by rendering any special assistance that they may require.

7. To hold regular exhibitions of products manufactured in the laboratory along with the issuing of reports and to invite persons or manufacturers interested in them and to display side by side the samples of similar imported articles together with statistics showing the quantity imported and prices and also pointing out the difference in quality if there be any, which might be in the way of introducing similar locally manufactured stuff into the market.

8. To hold periodic lectures on industrial subjects, with experiments, lantern slides, etc., by inviting experts from different parts of India or abroad if possible. In the *École Polytechnic* at Paris where periodic lectures on different subjects are conducted with the help of the best experts available in France who are actually engaged in industries as directors and managers and illustrate their statements by suitable models, appliances, to people interested on the subject specially invited for the purpose.

9. To have a department for the rapid commercial analysis of various industrial stuffs, not only the raw materials but also the finished products on payment of suitable fees. For example, if a sample of Kaolin is sent for analysis and found on examination suitable for the manufacture of high grade porcelain, the department might be asked to manufacture a set of articles out of that material on the presentation of a fee. The same practice prevails in the Industrial Testing Laboratory at Tokyo (Japan) and in the Tonindustrie Laboratory at Berlin. This has given very great impetus to the manufacture of various articles in these countries.

10. To have a testing department where articles for human consumption, medicines and drugs, instruments of precision, weights and measures, will get their certificates of guarantee without which they will not be allowed to be issued to the public.

11. To have an information bureau which will organise the connection between the prospecting buyer and seller and supply information to the public on matters industrial.

The Central Technological Institute with commercial museum attached to it should be situated close at hand to the centre of several industries. In my opinion the Technological Institute should be established in Calcutta with a department specially devoted to the various industries which might be developed in Bengal. Calcutta being the first port in India, there is facility in securing raw materials and the disposal of finished products;

there is proximity of coal, waterways, railways, and a large area surrounding it capable of being utilised as centres of industries. The Indian Institute of Science at Bangalore, though situated in an admirable climate having excellent surroundings, is so far away from industrial centres that no concern actually engaged in industries gets the benefit from its departments which is secured by means of frequent contact. The man in the industry would like to get his problems solved and his difficulties removed within the least time possible and he cannot afford the trouble and delay inevitable in communicating from a distance. So researches in the Indian Institute of Science at Bangalore or in the Imperial Institute at London, as far as I know, have so far been incapable of arousing any interest in the Indian manufacturers.

The Institute should consist of an up-to-date analytical laboratory, a testing department where all manufactured products can be tested such as cement, paper, textiles, sugar, medicines, drugs, etc., a workshop well fitted with all modern tools and appliances, a foundry capable of turning out special instruments and supply all the needs of the testing department and the laboratory, so that the whole thing might be self-contained. A well equipped library containing scientific and technical books in all the principal languages of Europe and periodicals dealing with scientific and technical matters, where the workers will get every facility to get up-to-date information. There should be kept a portfolio showing plans and designs of the best industrial establishments of the world and the designs of the most up-to-date machineries employed in industries together with catalogues of firms manufacturing and dealing with them. In this connection I am of opinion that the Patent, Trade Mark and Designs Department might be profitably incorporated with the Institute.

The Institute should consist of a director. I don't think it is necessary to call him Director of Industries or by any such name. Big names here are often misleading and unapproachable to the public. A person with a liberal scientific education, practical and businesslike, with power to organise and control, familiar with the country and the people, social and sympathetic, with a knowledge of French and German languages if possible is most suited for the position. I have no objection to whatever nationality he might belong to. If these qualities are difficult to find in one man a directorate may be formed of persons as is usually found in Germany, each having one or more of the necessary qualifications. There will be two assistants under the Director—one a highly trained scientist in direct charge of the laboratory and workshops and the other a practical business man with thorough general and commercial education in charge of the commercial museum. In my opinion the above two positions should be held by Bengalees who might be suitably trained for the purpose here or preferably in foreign countries.

The Board of Control of the Institute and the commercial museum should consist of—

- 3 representatives of Government,
- 3 business men,
- 3 directors or managers of manufacturing concerns,
- 3 scientists and

the director and assistant directors of the Institute as *ex-officio* members. The assistant director in charge of the commercial museum will act as Secretary to the Board of Control.

The working of the commercial museum may be viewed in two aspects. The first aspect is that of assistance in marketing products by bringing in contact the manufacturer and the dealer. The second aspect has been practically lost sight of, *viz.*:—that of exhibiting those finished products which find their entrance into the country as imports made out of the raw materials which are exported from here or out of similar materials that can be had here in quantities. The finished articles should be exhibited; the name of firms with their invested capitals in these industries, and the output, should accompany the exhibits. It is not possible that the Government should undertake to exhibit all the imported articles at once but can make a good beginning by selecting a few important ones. The undertaking is really of a very big nature but I think it will be a move in the right direction to arouse interest of the people in industries. I have seen a similar museum being organised in such centres of industry as Osaka in Japan.

Side by side with these things ought to be exhibited the locally made articles, if there be any, with a note from the Director as to the result of its tests, the advantages and disadvantages of each and the profitable method of overcoming any defect in the local made product. For example, scissors which are manufactured locally are being replaced here on the market by cheap cast steel American scissors which are brittle and hence less durable but they are of superior finish and the nickel plating which prevents rusting appeals to the purchaser. I may mention in this connection the Deutsches Museum at Munich, though not purely commercial, where the exhibits greatly appealed to my mind as to how to encourage the knowledge and taste of science and industry in the minds of young and old alike.

India abounds in all sorts of raw materials suitable for industrial development. Apart from what have already come to our knowledge, enormous quantities of hidden treasures are lying undiscovered and vast tracts of the country unexplored. It will take years of labour and patient investigations to ascertain fully the extent of her productive capacity.

The present day manufacturer has to face enormous difficulties in finding out and selecting the raw materials he wishes to have. In Europe organised trades exist to supply raw materials to industrial concerns. If I want to have a pure Kaolin having 45.6 per cent.

of Silica and 38·5 per cent. of Alumina, I can have it there the next day. What a great help and saving of trouble to the manufacturer! When the Calcutta Pottery Works were established in 1907, China clay was forthcoming from the hills at Rajmehal. I wanted to manufacture porcelain but I had no felspar. I was at a loss to know what to do. The records of Geological Survey of India could not help me materially. They could not enlighten me as to the possible source of a constant and economic supply of pure felspar and at last I was obliged to set out accompanied by a geologist on a felspar-finding expedition. After a fortnight's very hard work to which I was quite unused we were fortunate enough to find a good deposit of felspar suitable for the manufacture of high class porcelain.

I have no intention of disturbing the present method and scope of enquiry of the Geological Survey of India but in my opinion the Geological Department ought to supply to the proposed Technological Institute any mineral of economic interest and get the report of the Institute as regards the industrial utility of the thing and then proceed to detailed investigation if necessary. The Technological Institute as it is constituted will communicate with the actual consumers and base their observation on actual facts. The above method is to be applied to all departmental investigations of the Government such as forest, agriculture, etc.

After proper raw materials are secured the question of transmission comes forward. Here tariff rates of railway companies are a perplexity to the industrialist. My small experience suggests some examples. Porcelain, earthenware crockery and toys though made out of practically the same materials and having the same value (commercial porcelain fetches no better value than earthenware and crockery) weight for weight have four different rates of tariff. There are special rates for China clays imported from abroad to be used in industries established in different parts of India, where it is not however the principal ingredient, whereas in our case we are handicapped by heavy railway freight on this principal raw material of ours even in spite of our representations. The steamer freight of China clay from Europe to Calcutta is insignificantly small compared to the railway freights here. The marked capacity of waggons is another mystery to us. A waggon marked 16 tons holds wood owing to its low density nine tons only but the consignee has to pay all the same for 16 tons, apart from the question of rate. Further I find in the railway tariff that sand used for plastering purposes has got to pay rates higher than chemicals such as Epsom salt, while the value of one is thirty times as much as the other.

I claim to be no authority on matters dealing with railway tariff, but in my opinion, if any new industry is organised here, the railway companies should allow concession rates both as regards the carriage of raw materials and finished products to different distributing centres in India, then and then only the industry can develop and successfully compete with its foreign rival in the open market. I am sorry to state that owing to this cause the inter-provincial trade of the Calcutta Pottery Works could not be properly developed. Government should make some such arrangement so that this can be effected.

The question of securing expert knowledge in India is beset with many difficulties as everywhere else where it is intended to start new industries. I think it is not always safe and wise to put Indians, whether trained in foreign countries or locally but wanting in proper experience, in direct charge of starting a new industry. There may be exceptions to this rule such as the managers of the cotton mills of the Bombay Presidency who are mostly Indians. They have gained their experience after years of apprenticeship, they have begun their life at the bottom of the ladder and have risen to prominence by sheer dint of honest and attentive work under able masters. This is how would-be managers of industrial concerns should receive their training—a slow but sure education.

In Europe the managers of industrial concerns are men who have high educational qualifications before they serve as apprentices in industrial establishments and go through all stages of training in it before they get to the position of a manager.

When the position of expert knowledge is such, it is more safe and wise to get experts from foreign countries in the beginning as Japan did early in the Meiji era for developing most of her principal industries. What struck me most there is the employment of a German expert for organising her porcelain industry on modern lines—an industry which Japan may call her own and existing in the country for the last 600 years. Japan felt that her primitive ways, though perfected in their own lines, were unable to compete with its rivals in the markets of the world, unless she would take the help of the latest scientific methods and ideas.

As the appointment of a first rate able foreign director is essential in organising a new industry it is also essential that he should be appointed only for a limited period during which his Indian assistants, also of foreign training, are intelligent enough to take the sole responsibility in his presence, of the concern. The reason is this, because, a really first class expert is expensive, he is expected to charge much more than he gets at home and later on he might tell rather hard on the cost of the products when the output goes into the open market. The expenses that will be incurred in retaining his services will be considered as preliminary expenses rather than an item in the profit and loss account. I would suggest that the Government pioneer factories and the polytechnic, about which I shall refer later on, should be equipped with high class foreign experts as directors and teachers and under them should be placed qualified Indian assistants and pupils who after a training under the masters would be capable of taking independent charge of factories and to be assistants under them.

Now the question comes of men who would help these Indian directors and to take their place afterwards. Where would the factory people look for these men? In these days of specialisation, it is almost impossible that skilled labour starting from the lowest position can attain the post of a director at any time. For this purpose polytechnics are necessary. We cannot always afford to send people to foreign countries for technical education as this is costly and beset with many difficulties. It is only the directors who might take a trip to the various centres of industries in which they are interested in foreign countries in order to assimilate the growing changes in their line. It is sometimes urged that the polytechnics should come after the industries but in my opinion they should come before them,—as has been the case in Germany and Japan where the growth of the polytechnics really gave an impetus to the establishment of various industries. Considering the present state of industries in Bengal I would suggest the establishment of a higher polytechnic in Calcutta having a limited course of subjects at the beginning which might be extended later. I expect that this higher polytechnic in Calcutta would, if properly organised and managed, do the same thing for Bengal or for the whole of India as the great Charlottenburg polytechnic did and is doing for the industries of Germany.

Our experts after their training in foreign countries when they come over here have to face many difficulties. Since they cannot secure the experience much needed within the limited period of their stay in foreign countries, they cannot judge at the outset the time that would be required to successfully run a factory. The enthusiastic capitalist gets tired with this delay and in many cases he attributes all the delay and trouble to the technical inability of the expert. The capitalists here generally start industries without proper investigation and knowledge and after it has been handed over to the expert they shake off all responsibility and hardly think it necessary to co-operate with him. What could have been achieved under proper guidance and co-operation in 5 years is done under great difficulties in a decade. This is really the history of many sad failures.

There is another thing yet to be noted. The set of men so far chosen as properly qualified to be the future directors of our new industries and sent to foreign countries to secure experience were in my opinion in many cases not very happily selected. It attracted in many cases youths who finding no bright prospect before them in this country with their education and attainments, fell in with this idea of proceeding to foreign lands at public expense. It is very sad that these people had seldom the inclination, attainments, aptitude and other necessary qualities which are required in heads of concerns manipulating men and money.

The Indian artisans are unused to the life of organised big industries which are coming to this land. When we consider that such a small percentage of the people is educated, their ideas of living and concerted action so narrow and limited, the social system, easy-going life, small ideas of comfort, all go together to retard the growth of skilled labour here for organised industries. In my works I could not depend on potters simply but had to deal with all classes of people, representing all shades of castes. There were very great difficulties, no doubt, at the beginning to bring them down to one common level and to make them efficient workers. I have invariably seen that labourers having little education turning out more efficient within a short time than others without it. To my experience little sympathy, fellow-feeling and setting higher ideals of life before them and identifying their interest with the interest of the concern in which they are engaged invariably creates in them a sense of the dignity of labour. In industrial organisations where men are considered as so many units to transform one article into another at a definite cost, these factors are entirely lost sight of and naturally no sense of responsibility can grow in the workers and that is always the difficulty of a floating population near our mills. The mill hands can never identify themselves with the mill in which they are engaged for the time being.

In order to increase the efficiency of skilled labour and to create a taste for the work, I would suggest the establishment of an arts and crafts institution in Calcutta. This is most essential. Bombay felt the need and it has taken some shape there. The idea of night schools should be developed in the factories themselves more profitably.

When the proper article has been manufactured to the satisfaction of the market there is always the difficulty here, as the conditions now stand in marketing the product. In big organisations, it is not always possible to meet the retail dealers of its products neither is it a sound policy to do that and the manufacturer has got to work through an intermediary who knows the market well, having good credit and connection with the bank and can secure liquid money on credit for raw materials. For these therefore I would suggest the formation of a co-operative credit bank guaranteed by the Government and financed by the people which will finance industries on easy terms of interest for the purchase of raw materials, machineries for extension, stocking of finished products, etc. It will have branches in all industrial and trading localities, giving facilities for the purchase of raw materials as well as the sale of finished products. I felt this need many a time in my experience for the last few years. There is also another difficulty with which I am always confronted, namely, that of assistants with keen business instincts for looking after the commercial side of the industry. This is no less a difficulty than the securing of expert knowledge. Trade here, as was the case in Japan before the Restoration, has got associated with it not very elevated ideas in the minds of the people. A rich tradesman here will not command so much respect as a lawyer in the society. This has created a tendency of distaste of joining

any professional trade by our intelligent boys. Hence trade reports, trade journals are practically unused by the trades people which create great difficulties for organised industries to have a clear view of the market, and push business properly in right lines. Thus to elevate the ideas about commerce and to raise the position of the commercial people in the eyes of the public, I would suggest the establishment of a commercial college in Calcutta. The students from here will have proper ideas of finance and international trade, fluctuations of the market and many other business methods and knowledge and they will be the proper men who after training as an apprentice in an industry to be a successful business manager.

ORAL EVIDENCE, 28TH NOVEMBER 1916.

Mr. C. E. Low.—*Q.* Have you any knowledge of the extent to which Indian capital is invested in jute mills?—*A.* No.

Q. In tea?—*A.* Some of my friends are interested in tea. They have their own gardens.

Q. In coal mines?—*A.* One of our proprietors is interested. He is one of the biggest coal mine owners.

Q. Do the middle classes invest their money in coal shares?—*A.* Now they are doing.

Q. Is your company a limited company?—*A.* It is not a limited liability company. It is only a private concern.

Q. Have you a definite capital?—*A.* No.

Q. You obtained the capital of the concern from the partners?—*A.* Yes.

Q. Who were personally acquainted with each other?—*A.* Yes.

Q. How long has the concern been going on?—*A.* The new remodelled factory was started in 1907.

Q. What superior staff do you employ?—*A.* I have got two assistants. One is a graduate of the Bengal Technical Institute, and the other who was my accountant before now looks after the business side.

Q. Have they any particular technical qualifications?—*A.* The accountant has no technical qualifications, but my assistant was studying under me. I was a teacher in pottery in that Institute and he was under me for three years and he had practical training in my works.

Q. Have you any apprentices?—*A.* No. I have not got now.

Q. You make porcelain wares, especially electric insulators?—*A.* Yes.

Q. I understand you to say that you obtained certain trade connections through which to sell these, from the commercial museum?—*A.* Yes.

Q. You mean a provincial institute when you refer to a 'central technological institute'?—*A.* Yes, and not for India.

Q. You would prefer to see a number of provincial technological institutes?—*A.* Yes, if they are necessary for other provinces.

Q. You think that a skilled labourer starting from the lowest position cannot attain the post of a director at any time?—*A.* Now-a-days, it is so exacting and scientific, so far as my experience goes, that a skilled labourer cannot rise to the post of director in a highly technical industry like chemical industry.

Q. In your experience are students who have had technical training content to start at the bottom of the ladder or do they want to begin at once as managers?—*A.* For myself I am willing to start at the bottom of the ladder. Here we have no opening. When I came back from Japan and Germany I was placed in charge of a concern, and I am sorry for it. There was no help. I was obliged to accept the post of manager and the result has been that I have had to wait for ten years to build up this business and gain proper experience.

Q. My point was this. If you give students technical training in this country they do not realise that they have still to learn a great deal in the practical application of the theoretical knowledge, and they are not willing to begin lower down where they can learn that sort of thing by experience. They expect at once to get high posts, large pay and responsibility. You noticed that difficulty? How do you propose to overcome it?—*A.* They must get their admission as assistants in organised industries. There is no other help.

Q. Therefore you must have industries before you can give employment?—*A.* There are many students who have no employment whatsoever, sent by the Association for the Advancement of Scientific and Industrial Education. I was the first recipient of the scholarship from that Association.

Q. It is because there are no industries?—*A.* Because there is no industry here and no capital is forthcoming.

Hon'ble Pandit M.M. Malaviya.—*Q.* How many years did you spend in Germany and Japan?—*A.* One year in Germany and four years in Japan. I was in England for a month in Staffordshire.

Q. When you came out were you put in charge of these Pottery Works at once?—*A.* There was no Pottery Works then. Practically it was a small undertaking. I was put in charge of the concern and I developed it. From 1906 I have been in charge of it.

Q. You are of opinion that in the present state of the backwardness of Indians and of Indian industries, Government should give the first start?—A. Yes.

Q. And encourage industries by pioneering factories, where necessary, under proper conditions, and also by giving assistance financially in the way of guaranteeing dividends for a limited period?—A. Yes.

Q. With regard to the glass industry do you think that if the Government made the necessary investigations and published the results of those investigations, Indian capital would come forward to take up the business?—A. I think if proper investigations are made.

Q. If the Government publishes the information after investigation, it is possible in your opinion that without any Government guarantee the necessary capital may be subscribed?—A. Yes.

Q. But if the Government guaranteed dividends, then of course it will be subscribed without any doubt?—A. Yes.

Q. You have said in answer to a question by the Hon'ble Mr. Low, that you are in favour of one technological institute in each province?—A. Yes. So far as Bengal is concerned I want one.

Q. You think that the existence of the Institute of Science at Bangalore is not of much practical benefit to Bengal?—A. I think so. I have come in contact with various manufacturers and they have never expressed an opinion that they are getting any help from the Bangalore Institute or the Imperial Institute of London. It is my small experience.

Q. You think that every major province of India is a large enough country to have at least one central technological institute within it?—A. Yes.

Q. You are in favour of importing experts where necessary to push forward industries?—A. For new industries in this country.

Q. And you think that if the Government should help the promoters of new enterprises to bring in the right kind of experts, that itself would give a great impetus to the proposed industries?—A. Yes.

Q. You say "I have invariably seen that labourers having a little education turn out more efficient within a short time than others without it." You also say, "In order to increase the efficiency of skilled labour and to create a taste for the work, I would suggest the establishment of an arts and crafts institution in Calcutta." In your travels in England, America and Japan have you noted that the general education which artisans and labourers receive there promotes their industrial efficiency?—A. I have.

Q. They are far more intelligent than our Indian labourers are?—A. Yes.

Q. Do you think then that if the Indian labourers are to compete successfully with the Japanese, or English or German.....?—A. In Calcutta the Bengali carpenters are being replaced by Chinese carpenters. It is very difficult to find a good Bengali carpenter.

Q. In order that the Indian labourers should be efficient industrially as the English, Japanese, or the German labourers are, you think it essential, that they should receive general primary education and in addition should receive technical and industrial education?—A. Yes. As is done in the arts and crafts institution.

Q. You recommend the formation of a co-operative bank with a minimum interest guaranteed by the Government, to finance industry?—A. Yes.

Q. Do you think it would be enough if there were one such bank in each province, or do you want branches in the districts?—A. It will have branches in each of the districts.

Q. Have you in your experience felt the need of such a bank?—A. Yes.

Q. Have you in your travels in Japan noted the existence of such an industrial bank?—A. The first industrial bank of Japan was established shortly after the Restoration.

Q. And there are many such now?—A. Yes.

Q. Did you also note the existence of banks in Germany which finance industries?—A. No. I did not enquire.

Q. You have spoken of the railway freights affecting trade and you have given some very remarkable instances of differences in the rates. To whom did you make your representation on the question of rates?—A. We made one direct representation so far as our sand is concerned to the Railway Board, and they said they could not interfere. This was in 1905.

Q. Did you point out that the sand was required for plastering purposes?—A. It was only to reduce the freight on sand. We wanted to bring that sand from Rajmehar, but owing to the heavy freight we could not do it.

Q. You say, "I find in the railway tariff that sand used for plastering purposes has got to pay rates higher than chemicals, such as Epsom salt, while the value of one is thirty times as much as the other?"—A. Yes.

Q. You did represent to them that the rate on sand was very heavy?—A. Yes. On that subject one of the proprietors of the works will be the next witness coming and he will be better able to explain it.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. Before you went to foreign countries for this technical instruction what education had you?—A. I appeared for the B. A. examination in science.

N. Gooptu.

Q. You never attended any technical college?—A. There is no technical college here.

Q. You got your experience chiefly in Japan?—A. Yes. I was in the Higher Polytechnic in Tokyo for two years. At that time it was very easy for an Indian to go there. Now it is difficult so far as I have heard. I have been there once in 1909 also. At that time I found no difficulty in entering into it. Then I found my admission into the Testing Laboratory and worked for 1½ years. Six months I then spent in travelling and returned.

Q. Were you the head of any department in those works?—A. I was taken as a student.

Q. They willingly taught you?—A. Yes.

Q. I suppose you have no experience of the oil mills in Calcutta?—A. No special experience. I only got some information from reliable authority.

Q. You say, "Now the total output of edible oils, if all the mills are fully worked, is far more than the local consumption, hence the mills are obliged to shorten their hours of work." Do you know what is the imported quantity of foreign oil into this country?—A. I was speaking of oil for edible purposes,—mustard oil meant for human consumption.

Q. You are for the exhibition of the finished articles from foreign countries made out of the raw materials exported from this country so that the people may see the local article and the foreign article?—A. Yes.

Q. You want prices also?—A. Everything that can be done.

Q. Prices fluctuate every day?—A. They can put in the standard price or the average price.

Q. You say, "Managers in Europe of technical concerns are men who have high educational qualifications." That is, technical and scientific and not literary?—A. No.

Q. In your last paragraph you say that you would suggest the establishment of a commercial college at Calcutta?—A. Yes.

Q. Do you think that if a commercial college is established in this part of the country it will get students?—A. Yes.

Q. I ask you because we were told this morning we may not get them?—A. I do not think.

Q. Do you think that the people would like to go in for these studies?—A. Yes. Because other professions are being overcrowded this will be a new outlet.

Mr. Chatterton.—Q. Your practical experience, I understand, is entirely confined to Ceramic manufacture?—A. Yes.

Q. And on other matters your written statement is a record of your opinion based on information collected from other sources?—A. From my own experience.

Q. Do you mean to say that you have a practical knowledge of tanning?—A. No. Only from the Trade and the Navigation Report of Bengal I wrote it.

Q. You spoke of raw materials going out to foreign countries and coming back as manufactured goods?—A. Yes.

Q. What raw materials?—A. Oil seeds.

Q. How do oil seeds come back as manufactured goods?—A. Linseed oil comes in large quantities made up into paints and other products.

Q. Are tannin extracts imported into India?—A. I heard so.

Q. You have made a statement that raw materials go out of the country and come back as manufactured articles. I should like to know what are those manufactured articles which come back from abroad made of Indian materials?—A. Linseed oil.

Q. What other manufactured goods come back?—A. (Witness was not able to name any other goods.)

WITNESS No. 84.

MR. F. N. GOOPTU, *Proprietor, Messrs. F. N. Gooptu & Co., Manufacturing stationers, Pencil makers, etc., Calcutta.*

WRITTEN EVIDENCE.

Capital.

Qs. 1 & 2.—I have had no direct personal experience in raising capital for industrial enterprises and cannot therefore state the difficulties that may be experienced in doing so. I was for some time connected with the Bengal Luxmi Cotton Mills, Limited, while capital was being raised and my experience is that the capital for that particular industrial enterprise was principally drawn from the small savings of the lower middle classes. Well-to-do and the wealthy classes held aloof from subscribing either substantially or considerably to the capital.

Government assistance.

Q. 5.—All the seven methods of giving Government aid to existing or new industries mentioned in question no. 5 have my entire approval. The view that I am inclined to take of the present industrial position in this country is that existing and new industries are handicapped by lack of initiative, want and shyness of capital and other allied reasons:

and it is my conviction that there will be no marked improvement in the industrial position of the country until and unless a big push is given by the State and that push will naturally assume one or either of the various shapes suggested in the question. Money grants-in-aid may very well be given with proper guarantees to existing industries which are struggling for want of financial help and which after such help may become prosperous. Similarly new industries soundly conceived and for which there is admitted scope may very well be helped with money grants-in-aid. As regards the second method, bounties and subsidies may prove of invaluable help to the export of manufactured articles to compete in markets where bounty-fed articles are dumped.

Guaranteeing dividends by Government for a limited period may be done in the case of both existing and new industries, *e.g.*, in the case of an existing industry when it is doing fairly well but requires fresh capital to increase its capacity of production to meet demand, but is unable to attract fresh capital on account of the difficulty in guaranteeing a good dividend; the Government may here very well step in to help this industry.

I strongly approve of the fifth method of the supply of machinery and plant on the hire-purchase system because it combines to my mind the minimum of risk with the maximum of helpfulness. The machine so supplied will always be under the Government who should have a lien on it and Government may also arrange that it should be inspected from time to time to see whether it is in proper working order. By this arrangement Government will stand to lose little or nothing while the individual or the firm so helped will be materially benefited. It will be an incentive to manufacturers to adopt new and latest methods in their business and will give employment to more skilful men or artists. Government might further help by placing orders for the output of this machinery should the supply prove satisfactory under the seventh method, *viz.*, guaranteed Government purchase of products for limited period.

In my experience I know of a case in which a gentleman started a business with a small capital of his own with the expectation that he will be able to raise capital if he can survive the experimental period. Unfortunately he could not manage it with his own capital and had to close up and sell the factory to another person. In another case the originator of the enterprise after making his enterprises experimentally successful could not get a proper partner or capitalists to finance him and had to close up his business.

Q. 6.—In methods (3), (4), and (6) and the form of control as suggested should be by the appointment of Government Directors with defined powers for the period during which direct assistance lasts.

Qs. 7 & 8.—I have no experience of Government pioneering factories but I am sure they must be of great value as a stimulus to industries. In every instance care should be taken that no Government pioneered industry comes in competition or conflict with industries already flourishing and also that the original intention should be to place such industry in hands of others after it has proved a success. Pioneer factories.

Government should pioneer industries which, if advised by their experts after due investigation, are likely to be successful from a financial point of view but which have not been taken up by private enterprise and the extent to which such industries should be pioneered should be the established success of such industries. I do not think it would be right in any case to close successful pioneer factories but they should in every case be handed over to private capitalists or companies. The conversion of successful pioneering experiments into permanent Government enterprises should be avoided as a rule.

I may here include questions 19 and 20 relating to demonstration factories. These factories should certainly be established in my province as well as elsewhere not only for the purpose of experimentation but also to train experts in new industries and to grant commercial education to the young men. The special aim of these demonstration factories will be not only to create an expert, a workshop manager, a man of business but also a foreman or a clerk. These demonstration factories must form a part of an industrial school where a course of commercial training can be given to the pupils to complete the commercial side of the expert. An expert is not always a good commercial or business man. An agricultural school with a farm and an industrial school with a workshop may be started. Demonstration factories.

In Germany there are "manufacturing laboratories" employing experts and 120 men and carrying on technical investigations to aid in manufacturing works of its founders. In this connection I wish to mention that it is absolutely necessary to establish an up-to-date manufacturing workshop and laboratory to tackle the important questions of jute mills and to help the Government in the manufacture of munitions.

Qs. 10 & 39.—Some of the various ways of giving substantial assistance to industrial undertakings by existing or new banking agencies are as follows:— Financing agencies and banking facilities.

1. By credit system. By this I mean (a) that by depositing a certain amount of money in any bank, a facility is obtained of purchasing machinery and plants from foreign countries; (b) by advancing money on the acceptance of hundis by a respectable solvent party; (c) by advancing money on the hypothecation of goods and plants and machinery where necessary.

2. By giving financial facilities in time of urgent need on a moderate rate of interest. For example, suppose a firm wants to make a big payment in the mofussil for

purchasing a large quantity of raw materials, the bank on the application of the party and on the security of the firm ought to arrange for the temporary accommodation on a moderate rate of interest.

3. By negotiating Bills of Exchange.

4. By acting as a collector of money on hundis accompanied with shipping or railway documents.

5. By granting loans on the recommendation of Government experts to industrial enterprise whose success is otherwise assured.

perative
ties.

Q. 12.—In my opinion small or cottage industries are likely to be helped by co-operative societies. These industries do not require a large capital while they are not of a speculative nature. They would certainly benefit by the help of co-operative societies and would substantially increase the material prosperity of the people. The organisation of these societies should generally be on the same lines as those of the existing co-operative credit societies. They should be brought nearer to the people by the inclusion of the people on the governing bodies. The special object of these societies should be to give financial help to small village and cottage industries and to induce people by example to save money by investing small savings which they have got in the co-operative society in their village. This system will help not only the small and cottage industries but will be a great boon to the cultivator class and also to the zemindars.

its of Govern-
t assistance.

Q. 13.—Government aid should first be granted in any of the shapes mentioned in clause 5 to deserving existing private enterprises. In no case should Government pioneer the starting of an industry similar to one already existing in the same province. The existing company should first be given a chance to improve and to meet the public demand and if it fails then a similar industry on an approved line may be started.

There ought not to be any limitation to Government aid to a new enterprise even if it competes with an established external trade so long as Government would be convinced of the ultimate success of the concern. Proper control should always be kept over the enterprise so long as Government aid continues. The main object of this aid ought to be the establishment of such factories in India as will be able to compete side by side with any imported goods whatsoever.

mical aid.

Q. 15.—I have no personal experience on this subject. But I know that in Madras the experiment of ground-nut pressing has reached a successful stage and Government is helping a private party to make this a successful commercial enterprise.

Q. 17.—Government experts ought to be allowed to work for private firms or companies. An expert may be lent to an industrial enterprise (1) for a short period free of all charges to help the company to overcome some difficult manufacturing process; (2) as paid adviser for a long period to help the promoter of the industry from the beginning to train up his own men and to run his concern in the proper lines thereby saving a lot of money in the experimental stage; (3) as a consultant free of charge to advise whenever required by any company or firm; (4) as an expert in organising a new concern as to the pros and cons of starting an industry in any province and of the suitability of any particular industry.

Q. 18.—The results of researches of Government paid experts while attached to a private business may be allowed to be published so long as the same is not detrimental to the interest of the party concerned or is of such an importance that many concerns will be benefitted by its publication. The results may be published in a particular magazine published in the same line as "American Scientist," "Machinery," etc.

earch abroad.

Q. 22.—I would rather prefer researches to be conducted in different parts of India, as experts from foreign countries always find various difficulties when they come to India to work for any industrial concern.

veys for indus-
l purposes.

Qs. 25 & 26.—I am of opinion that an industrial survey on a large scale may be arranged by the Government with the co-operation of private qualified men to explore the vast tracts of India still lying untouched, e.g., virgin forests of the Mourbhunj Raj, the mineral tracts of Bengal, United Provinces and Rajputana. The precise objects of such a survey will be the discovery of various rare and valuable minerals and of forest products and of suitable areas for the growing of particular crops, thereby bringing about the expansion of existing or the creation of new industries.

Q. 27.—By the publication of the results in the Government publications under the Director-General of Commercial Intelligence and Director of Industries whenever required by any company or firm.

omercial
semin.

Qs. 28 & 29.—My personal experience and opinion of commercial museums are that they serve a very useful purpose in the industrial world. I have obtained a large number of customers after the first tour of the commercial museum organised by Mr. A. H. Ley, I.C.S., and worked by Mr. P. R. Rice. It served the purpose of not only bringing together customers and manufacturers but of an advertising medium. It is very useful for small industries and unorganised cottage industries. It helps everybody to find what can be manufactured in India and thereby helping to establish business relations with various parts of India and also with the foreign countries.

Q. 37.—I may here suggest that another section ought to be added in the commercial Government!pat museum in Calcutta, viz., the section displaying imported samples with approximate require- ments of the Government of India to enable manufacturers to tackle them. These museums should be developed and established in each commercial centre under a curator assisted by an efficient staff of assistants controlled by the Director of Industries. There is a general complaint that manufacturers cannot supply goods when ordered. To rectify this defect, the Director of Industries ought to take up such cases and find out the real cause of the complaint and do the needful. I approve of the method of working as is followed in the museum in Calcutta.

Q. 30.—In my experience I have found that the products of minor and unorganised Sales. cottage industries can be sold very conveniently if a permanent commercial emporium is established in the centre of the shop quarter of Calcutta. Its development may be effected by allotting to each applicant a small stall at a very moderate rate where the products can be displayed and sold to customers. A small section of our Sir Stuart Hogg Market if let to manufacturers on a cheap rent may very well serve this purpose. The aim of this is to place various kinds of products in one place for the convenience of the buyers and visitors.

Qs. 31-33.—Industrial exhibitions if carried on on the basis of the great International Exhibitions. Exhibition held in Calcutta in 1884 will be very useful to encourage industries in India. The main object of the exhibition will be to demonstrate the methods and the latest appliances used in other parts of the world in the Industrial and Agricultural Departments. This form of exhibition ought to take place once in every 10 years.

In addition to the above during the intermediate period exhibitions in the form conducted at Calcutta in 1906 and at Allahabad in 1910 will serve a very useful purpose. In short there must be demonstration departments in these exhibitions. Government must take the initiative and encourage these exhibitions through the Director of Industries.

Qs. 34 & 35.—It would be certainly an advantage to appoint trade representatives for Trade representa- the whole of India in Great Britain, the Colonies and Foreign countries. Only experts tives, or men having special knowledge of trade can be so appointed and their duties should be to advise the Government of India and representative bodies of the trading community in India about the possibilities of trade between the countries to which they may be appointed and India in respect of articles of Indian manufacture or produce, i.e., export trade. Temporary commissions for special enquiries may also be appointed.

Q. 36.—Inter-provincial trade representatives in India would be of great help in promoting trade between the different provinces. The representation might be arranged for by nominating qualified men in the different provinces to communicate with one another and advise the Government and tradesmen from time to time.

Q. 39.—A central Industrial Bank for every province with branches at all industrial Banking facilities. centres should be established under the supervision and control of Government. These banks should help in marketing indigenous products and should give reasonable credit to industries.

Q. 40.—The conditions should be:—(1) that the Government should derive no profit Supply of Govern- and should realise only the cost of raw materials and that of supplying it: (2) that payment ment-owned raw should be made easy either by instalments or hire-purchase system or by following the materials. bank system of realising demands on invoices after sixty or ninety days: (3) that the materials should be supplied as promptly as possible: (4) that the rates must be fixed on a yearly basis.

Q. 41.—At present industrial development suffers much from the various forms of Land policy. control by means of licenses from the municipality regarding permission to use land for industrial purposes. There are two forms of licenses to be paid to the municipality, one for using a particular plot of land for establishing factory and the other for storing up raw materials and carrying on business in the same place.

Government assessments ought to be reduced on lands totally used for industrial purposes as they generally do in case of public buildings and those used for worshipping places.

Municipalities must not enforce all the strict laws relating to sanctioning buildings for industrial purposes, e.g., erection of mill-houses and workshops.

I know of a case in which sanction was refused to erect washing platform and w. c. on the side space in a factory. This case was referred to the general committee and the plan was passed after a long time.

Q. 42.—Each case of concession will have to be dealt with on its own merits. In the case of new industries it may be necessary to grant land rent-free for a fixed period, after which, the industries having meanwhile become profitable, land revenue with arrears may be gradually realised. In the case of existing industries land may be granted on a reduced rent.

Qs. 44 & 45.—In our province skilled labourers are very rare and costly. Labourers with ordinary intelligence form the greater part of men employed in industries. In my own business I have always taken care to employ some very best skilled men and to use them to teach, train up in special lines quite a lot of young adults with common intelligence and make them fit for handling machinery properly. I have always given them encouragement by increasing their pay when I found them useful. I practise in my establishment the premium

system of wages as advocated by the Americans to reduce the cost of my production or in other words what is known as "High wages with low cost." I give my head mistries chances to suggest improvements in the method of manufacture and invention of new machine parts whereby our output can be increased and give them bonus when the attempt becomes successful. I have derived very good results out of all the items mentioned above.

In my opinion labourer's efficiency and skill can be increased generally by (1) allowing them to associate with best skilled trained men, (2) giving them facilities to improve and paying them when they do so, (3) teaching them the principle of co-operative credit system, and (4) teaching them to take interest in the concern where they are working by sympathetic treatment.

living of labour
supervision.

Qs. 46 & 55.—Apprentices trained up in factory and workshops sometimes turn out good mistries in the end. These apprentices are made to undergo a course of at least 5 years during which time they get graded monthly allowance just sufficient for their food and clothing. During the period some of the workmen acquit themselves very cleverly and are promoted. These apprentices are made to attend factory works during the day and night classes in established schools to learn drawing, mathematics and English. If this system is made universal and free industrial schools are established, workmen of better calibre as well as men required for the various departments of business can be trained up very easily. These schools should be under the control of the Department of Education and there should be three standards in them. The first standard will be such as to create a man of business, a merchant, a trader or an expert. The second standard will be to create head clerks, accountants, auditors, cost clerks and stenographers and the third will be to create head mistries, draftsmen, mistries and skilled labourers generally. Best results will be obtained by making apprenticeship system co-ordinate to industrial schools so that boys will be compelled to learn something if they want any mechanical training.

Departments of Education and of Industries can be made to work in unison in controlling industrial schools if the Industries Department give facility by employing the deserving candidates passed from the industrial schools in their respective spheres. Uniformity of standards of examination for mechanical engineers held in various provinces must be kept up. Men who qualify themselves in the first standard creditably ought to be allowed to study conditions and methods in other countries under private or State scholarships, thus helping them to complete their training. Technical and commercial trainings are absolutely necessary for a prime mover in any concern whatsoever.

cial organisation.

Q. 56.—My suggestion is that Provincial Departments connected with industrial enterprise should be established and developed. In this connection I beg to propose that Provincial Directors of Industries assisted by technical experts and advised by Boards of Industries consisting of non-official members also should be established as is now in vogue in Madras. Our main ground of supporting the above proposal is that the Director of Industries being at the head of an organised Department and assisted by experts will be able to carry on experiments on all the different items as named below :—

- (a) Chemistry including agricultural, metallurgical, tinctorial and pharmaceutical chemistry :
- (b) The leather and hide industries :
- (c) Glass-making :
- (d) Sugar and alcohol manufactures :
- (e) Paper making :
- (f) Oil-seed industries :

at a nominal cost, being able to gather correct information regarding raw materials and procuring same at a nominal cost through the other Departments of Government. This process is likely to lessen the initial costs of the experimental stage of industries as practical results of his experiments should be available for all people willing to invest in such industries. He should be competent to visit factories on special request from the party concerned and to give them such advice as to overcome their difficulties.

Regarding relationship of Provincial Industries Department with an Imperial Department I suggest (1) the Imperial Department should have power to govern and control the various Provincial Departments ; (2) It will consider and give effect to proposals recommended by the Provincial Departments ; (3) It should dictate the broad lines of action of the Provincial Departments who should go more into details regarding the questions arising before them ; (4) The Imperial Department, as implied above, should be vested with powers which should steer a middle course, that is, it should not be vested with statutory powers to control the smaller and more specialised details but on the other hand its functions should not be purely advisory.

efgence libraries.

Q. 78 & 79.—I have found from my experience that there are hardly any technical and scientific works of reference worth naming in the Imperial Library in Calcutta. It is absolutely necessary for Government to establish a Department collecting all the latest technical and scientific works published all over the world. Without such a library no commercial college will be complete.

olleges of com-
merce.

Q. 80.—A college of commerce is necessary in our province. In this college the higher standard of the industrial school will be taught. The main object of this college will be to

create, as I have said before, a man of business, a merchant or a trader. Preference should be given to merchants and traders to have their sons trained up in this college. Attached to this college there must be a well-equipped chemical laboratory where analytical works can be carried on by experts.

Q. 81.—This college can be of great help to the development of industry if they create a department wherein minerals can be thoroughly analysed and experiments taken up on the application of any particular concern regarding their particular difficulties. It can also find out other new lines hitherto unexplored out of the raw materials obtained in India in large quantities specially in the preparation of drugs and aniline and vegetable dyes.

Q. 82 & 83.—The Director General of Commercial Intelligence and the Director of Statistics and cc Statistics should collect all available information and statistics and should place them at the disposal of the Imperial Department of Industries who will cause the same to be circulated to all the Provincial Departments under it.

Q. 84.—Indian Trade Journal helps the industrial people a good deal. It circulates Industrial and tra information of various industries which have been started in a businesslike way and which journals. have got prospect of success. Also it informs the public the location of possible industries, the presence of raw materials and how these raw materials can be profitably utilized. In short it deals with various important matters directly connected with industry and trade. Personally I gained much from the publication of a short editorial note regarding my concern in the copy of the Indian Trade Journal of 1st October 1908.

Q. 85.—Government ought to establish and assist industrial and trade journals.

Q. 86.—Dealing in general and special industries these journals or pamphlets should be supplied free of charge to all applicants. They ought to be printed and published in three languages, *e.g.*, English, Bengali and Urdu so that they can be read by the people of India.

Q. 87.—The publication of special monographs will be of very great importance re- Other Governm regarding the sources of raw material and possible scope of a particular industry. Copies of publications. these publications should be sent to industrial concerns directly concerned with the subject dealt, *e.g.*, publications of Forest Departments regarding wood ought to be sent to firms directly connected with the manufacture of wooden articles.

Q. 88.—Government ought to invite information from parties directly concerned in research works on particular branches of industry.

Q. 89.—Government certificates of quality should be established for (1) products Certificates used by the Government of India, (2) chemical and pharmaceutical products, (3) paints and quality. dye stuffs, (4) food stuffs.

Government certificates must be made compulsory for chemical and pharmaceutical products. This is absolutely necessary as the consumers can easily be convinced that they will not be cheated in buying a thing which bears the Government "hall mark." It will greatly help the circulation of a really good thing without being hampered by bogus and worthless competition.

Q. 90.—The Government college of science and commerce should do this work and their certificate will be quite sufficient for the purpose.

Q. 91.—Medicines, foods, dye stuffs.

Prevention of adulteration.

Q. 92.—This should be done by surprise visits by Government experts to factories for securing ordinary samples for chemical examination.

Qs. 93 & 94.—The present state of Indian law relating to marks and descriptions of Misdescription. proprietary and other articles of trade is very unsatisfactory. Parties directly infringing the law get off very easily as these offences are not treated as criminal offences. Formerly cases of infringement of trade marks and trade descriptions were severely punished sometimes with imprisonment. At present such cases are looked upon as civil cases of damages. From my personal experience, I think that law relating to trade marks and trade description of proprietary and other articles should be altered and more strictly enforced.

Q. 95.—The patent laws at present in force in India are hardly worth the paper in Patent laws. which they are written. They should be properly reformed and enforced.

Q. 96.—It is desirable to introduce a system of registration or disclosure of partner- Registration of ships. partnerships.

Q. 97.—The lack of transport facilities by road, rail or water hinders industrial develop- Roads, railways ment in our province, very seriously. Railway Company should provide applicants with and waterways. waggons in any station where they are wanted. Loading platforms should be established as near as possible to exporting centres. Moreover, the steamer companies charge very excessive freights which in some instances are over one-third of the price of the raw material as there is no regular service in the locality. Regular steamer service ought to be established with British East Africa where various sorts of raw materials can be procured. Also there is no regular steamer service with various parts of India, *e.g.*, between Calcutta and Madras. This ought to be started.

Q. 98.—The freights charged by railway companies are very excessive. They have two kinds of rates, one is known as the tariff rate and the other ordinary rate. These tariff rates are not known to many people and are not communicated to intending importers by the

* railway offices. Necessarily ordinary rates are generally charged. Moreover it may not be possible to obtain a full waggon load of suitable timber in one neighbourhood, but the railways charge freights not for the actual weight carried but for the full capacity of the waggon. Another point is the exorbitant charges in freight made by one railway for allowing waggon of another company to travel over their lines, *e.g.*, Bengal Nagpur Railway waggon travelling over Eastern Bengal Railway from Dock Junction to Sealdah, and undue delay is made in similar transshipments. Another instance I wish to bring to the notice of the Commission is the exorbitant rate charged by the railways to carry Indian made articles from the manufacturing centres to other parts of India, thereby seriously handicapping the progress of industry in different parts of India, *e.g.*, railway freight charged for goods despatched from Calcutta to Madras is more than that charged for similar goods of equal weight from Japan to Madras. I should like to recommend that railways (1) should only charge for the actual weight carried as the fixing of the capacity of the waggons is open to various sorts of comment: (2) that regular standard of the tariff rate should be fixed for transport between any two stations: (3) goods intended *bonâ fide* for manufacturing industrial purposes should be treated as Government goods and should be charged half rate: (4) a special rate should be charged for forwarding Indian made goods from one part of India to another thereby giving facility for the consumption of Indian made articles.

st Department.

Q. 105.—From the point of view of industrial enterprise, I wish to comment on the method followed by the Forest Department regarding disposal of the trees within the jurisdiction of the Conservators. They sell to a contractor all the trees growing in a certain area. This contractor disposes them of in the way he thinks best. In some cases the Conservators even refuse to sell trees wanted specially for manufacturing purposes within a certain area. The factories find it difficult to get into touch with the contractor and so obtain a sufficient special variety of wood they require. Moreover, these contractors charge excessive prices for supplying these woods. In my opinion where a special variety of wood is required for a new industry, the Forest Department ought to make special arrangements for the supply of the wood direct to the party or through the contractor on favourable terms. This procedure, I am informed, has been followed in the case of Upper India Timber Company's match factory by the Government of the United Provinces.

Q. 110.—The following are my suggestions regarding the development of industry in which I am personally concerned :—

- (1) The service of a first class expert in pencil-making is necessary for a limited period.
- (2) The service of a first class expert in colouring and varnishing is necessary for a limited period.
- (3) Some latest automatic and up-to-date machines are necessary on hire purchase system; machinery and its price should be selected and settled by us.
- (4) Special concession regarding freight both of railway and of steamer service in and out of Calcutta.
- (5) Guaranteed Government consumption of our manufactured goods.

Q. 111.—I suggest the following new industries as peculiarly suited to India :—

- (1) Chemical and pharmaceutical works.
- (2) Vegetable colours.

Q. 112.—The supply of mica for use in industry or trade is retarded by preventible causes.

ORAL EVIDENCE, 28TH NOVEMBER 1916.

Mr. C. E. Low.—Q. I understand that you are concerned with pencil and stationery manufactures?—A. Penholders, pencils and nibs at present.

Q. Is your concern a private partnership or a limited company?—A. It is my own firm. It is a private firm. It has been carrying on business since 1905.

Q. You supply a certain amount of goods to the Government?—A. Penholders.

Q. Including pencils?—A. We at present supply pencils to Government.

Q. You began to supply them a year or two ago?—A. Pencils were supplied two months ago.

Q. You get your wood from Africa?—A. Yes.

Q. You can find no Indian timber which is suitable?—A. I tried several timbers from the Maurbhanj forest but none of them were successful.

Q. Did you obtain information from the Forest Research Institute or the Forest Department about the kinds of timber suitable for pencil-making?—A. I had some communications and got some information about juniper. Later on I organised a party and made research myself in the Bengal forests and got hold of several timbers which could be had from a short distance of Calcutta. Two of them we found to be successful.

Q. You think that juniper does not exist in sufficient quantities to be available for this purpose?—A. Especially it is very costly. You cannot sell it in competition with foreign goods.

Q. Do you find any difficulty in financing your business?—A. For the first six years I had to suffer every difficulty, and I went on experimenting and trying to solve my difficulty, and I afterwards succeeded.

Q. Did you obtain the help of any bank for working capital?—A. No.

Q. Or private money-lenders?—A. I had my own money at my disposal.

Q. You did not go beyond what you could provide yourself?—A. No.

Q. If you had more financial facilities given you could have extended your works more rapidly?—A. Yes.

Q. You felt the pinch of lack of capital?—A. I did not want to go to anybody to ask for capital, because our people do not attach much importance to these preliminary enterprises. First of all, we must make it a success and then of course if they like they may come and help us.

Q. You are not prepared to go to the public and obtain money. Do you think it is worth doing now or can you manage without?—A. I am not in favour of going to the public.

Q. Do you consider that, in the case of any new enterprise if the Government gave facilities for technical investigation of the different things which were required to be found out and the reports were satisfactory, the people would put money into it?—A. In some cases they would.

Q. Enough to enable the industries to start, or would further assistance be required from Government?—A. If it be a new industry, of course in the experimental period it ought to be supported by Government.

Q. You think that if it were a new industry it would not be supported unless it was worked on an experimental scale?—A. Unless the success is guaranteed by Government experts or the Government pioneer the industry.

Q. By guaranteeing you mean that the Government should make good the loss if it failed?—A. The results of the experience of the Government during the experimental period will be available to any person who will invest money.

Q. Do you think that an industrial bank is required?—A. Yes.

Q. How would it raise its money?—A. Government can support it by taking part of the shares of that banking corporation, and thereby give inducement for private capital to come to the bank.

Q. If Government took a number of shares it would encourage private people to put money in?—A. Yes.

Q. Have you had any assistance from the Calcutta commercial museum?—A. Yes. I got my things circulated during the tour of the commercial museum all over India.

Q. Do you think it would be advantageous if you had commercial museums in other provinces as well?—A. I think so, and there should be some interchangeable system.

Q. You suggest an emporium for cottage industries in Calcutta. Who would sell the things?—A. It may be organised by a committee, or there are some firms who will take care of their own goods. There ought to be a committee for the sale of these goods.

Q. Do you think that the artisans will have confidence in that committee?—A. If it is controlled by a Government official they will have confidence.

Q. You say, "Government assessments ought to be reduced on lands totally used for industrial purposes." Would you apply it to a jute mill?—A. I have taken into consideration the starting of new industries.

Q. How much is the Government assessment on such lands as a rule?—A. It depends upon the rent of the place.

Q. It is a tax?—A. Yes.

Q. Have you any apprentices?—A. No.

Q. Do many people apply to you to be taken on as apprentices?—A. I have already taken two or three to work in my factory, but they are very reluctant to take up the work on the same level as mistries.

Q. They want to take higher posts of responsibility?—A. They want to be treated on a higher standard than the mistries.

Q. In what way?—A. They do not want to attend properly at the factory hours and want to avail themselves of the holidays and Sundays.

Hon'ble Pandit M. M. Malaviya.—Q. You are strongly in favour of Government supplying machinery and plant on the hire purchase system?—A. Yes.

Q. Would you limit it to cottage industries or would you go beyond that?—A. Even beyond that. In the case of larger industries also.

Q. You advocate the establishment of a central industrial bank for every province with branches at all industrial centres under the supervision and control of Government. Do

you mean by the nomination of directors, or merely by means of an independent audit by Government auditors?—A. There must be a director on the board nominated by the Government.

Q. You complain of the land policy of the municipality. Don't you think that the restriction regarding the creation of a factory within municipal limits are laid down in the interests of sanitation?—A. Yes. When once a particular site is approved of and a license granted to a party for establishing a factory, it should not have to be renewed every year.

Q. Has the license to be renewed every year, or have you to pay a certain amount of tax?—A. There are two kinds of license, one is a trade license and the other is a health license.

Q. Have you to get a license for the factory every year?—A. We have to pay Rs50 every year to the Corporation.

Q. Suppose you failed to obtain a license, would you have to close it?—A. I would be under the penalty.

Q. Have they any power to refuse you the license?—A. That depends upon their choice. I had very great difficulty in securing a license in the first instance and having got it I am getting it renewed every year.

Q. I take it that once you have obtained a license you have to pay a fee every year and then they will not cancel the license except for special reasons?—A. Yes, but I have not heard of any case about cancellation of the license.

Q. You speak of the system of apprentices being trained in factories and of the education that they should receive. Don't you think that a general system of elementary education supplemented by technical instruction would be better than this system of apprenticeship?—A. Practically the same thing. When they get apprentices in the factory they are ordered by the factory to go and study in the night school.

Q. Would it not be preferable that they should obtain a certain amount of general education and then go to the factory?—A. Our poor people cannot afford to do so.

Q. At what age do you get children into the factory?—A. If it is not prohibited by the Factory Act, from six years upwards.

Q. At that tender age boys cannot do much work?—A. They will be better at that time in the general primary school? But they cannot afford to get their food. We pay them something for food, as food allowance.

Q. You say that there are very few technical and scientific works of reference in the Imperial Library at Calcutta?—A. Yes.

Q. Have you brought this matter to the notice of the Council of the Library?—A. No.

Q. Have you brought the inequalities in freight charged to the notice of the Railway Board?—A. I had a particular case of mine. I applied to the Traffic Manager and put the case before him and after a long time, i.e., six months, I got a refund. My case was heard and it was decided in my favour.

Q. You say, "the railway freight charged for goods despatched from Calcutta to Madras is more than that charged for similar goods of equal weight from Japan to Madras"?—A. I brought it to the notice of the booking office authorities. They told me that if I described my goods as country made goods I might have a chance. I did so but nothing happened.

Q. You did not persist in making your representation?—A. I went on describing my goods as country made goods but I have not got any advantage.

Q. Are you not able to raise the necessary capital to bring about the improvements that you mention in answer to question 110, in your own factory?—A. I have got experts at present. I am not satisfied with their knowledge. In order to compete with the imported pencils and to meet the requirements of the market especially of the Government of India I require a little assistance and encouragement from Government. Moreover I have not got the opportunity of knowing a really qualified man in my line who will be able to help me.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. Can you tell us what made you to start this pencil factory? Have you had any experience of this line?—A. No. It was long before the Swadeshi movement.

Q. If you have no objection will you tell us what capital you have invested in your industry?—A. 3½ lakhs.

Q. Were the Government buying your products before the war?—A. Yes. Within a year or two of my starting they purchased. I think it was in 1907.

Q. When you talk of Germany and the manufacturing laboratories, have you got any experience of that?—A. No. I read in books.

Q. About cottage industries, what industries you think ought to be started?—A. Textile industry, handlooms, pottery works, agriculture.

Q. When you talk of the International Exhibition of Calcutta and the Allahabad Exhibition do you know what money was spent on it?—A. As regards the International Exhibition, of course, my information was from my father. He was one of the members of the executive committee and what I have heard is from him. A good deal was spent on it.

Mr. S. N. Dut

Q. Do you know if there have been any good results from the Allahabad Exhibition where a lot of money was spent? Do you think that it is a benefit to spend money on this kind of exhibition, or do you want permanently small exhibitions, that is, district exhibitions?—A. In district exhibitions exhibits do not come from far-off places, and we have no opportunity of seeing what other provinces are producing. If they are made permanent and an interchanging system of exhibits is introduced, then we can have the advantage.

Q. You do not know what money was spent on the Allahabad Exhibition?—A. I do not know. So far as I have heard, it was not a financial success.

Q. You are in favour of our representatives in the other countries for trade purposes?—A. Yes.

Q. Do you think that will benefit us?—A. Yes. I know a friend of mine who went to America and set up a trade in lace and he did very good business.

Q. You can do a lot of export trade from India?—A. Especially Agra toys.

Q. You are for a central industrial bank. For each province or for the whole of India?—A. One central bank is quite enough with branches.

Q. In what way is the Government to help that?—A. Government ought to take shares in that in all different ways. There must be a Government director.

Q. You talk of a college of commerce. Do you know anything about the College of Commerce, Bombay, or its curriculum?—A. No.

Q. About railway freights, have you approached the railway through the Chambers of Commerce?—A. No.

Q. You want better experts in your own factory than you have at present?—A. Yes.

Q. You want Government to give the expert without pay?—A. Not without pay.

Q. If there is a Government expert, you can take his help occasionally?—A. Generally I do not require a whole-time expert.

Q. In your factory you take boys at the age of six?—A. Not as workmen. They are allowed to carry things from one place to another. They are boys 8 or 10 years old. They do as much as they can.

Q. They do not come within the Factories Act?—A. No.

Q. Do you pay taxes to the municipalities?—A. Yes.

Q. I understand that you had difficulties with regard to the supply of suitable wood and I suppose you made experiments?—A. Yes.

Q. Are you getting your wood from East Africa?—A. Yes.

Q. Is there any difficulty?—A. There is no regular steamer service. It takes six months for one consignment to come from there. When they are supplied in logs they are supplied unseasoned.

Q. From where do you get supplies of graphite?—A. My graphite is from Ceylon. They send it in powdered condition and we wash it and free it from all kinds of impurities.

WITNESS No. 85.

MR. S. N. DUTT of P. N. Dutta & Co., Mechanical Engineers, Bucket Manufacturers, etc.,
Proprietors of the Bengal Galvanising Works, Calcutta.

WRITTEN EVIDENCE.

Q. 1.—In raising of capital for industrial enterprises my experience is limited to small Capital industries. I believe it is easier under the present conditions of India to devise a scheme for the development of industries on proprietary than on joint-stock basis. No industry can be started until we have some amount of capital of our own, which should be sufficient at least to buy the machineries and to set up a factory. The working capital may be obtained on loan. Some amount of credit also may be always had from the parties who supply us the materials. But this is not enough to meet all our demands. When productions and sales work in concurrence the factory runs smoothly, without incurring any debt. But the demands may be fluctuating very often, though the factory wheels have got to be kept on moving always. The result is a large accumulation of manufactured goods and consequent stoppage of circulation of capital. In such emergencies we have to run to the Marwari money lenders who charge a usuary rate of interest, sometimes over 36 per cent. per annum. But if this loan can be obtained from some banks, at a reasonable rate of interest, many a promising factory can be saved from premature death.

I may venture to suggest that an industrial bank, supported by the Government, in the lines already indicated by certain witnesses in their evidence, will be of enormous help in developing the industries of the country. Cheap labour is plentiful here, experts trained in foreign countries are not difficult to obtain, and a small amount of capital is also to a certain extent freely available. If these can be supplemented by some form of banking facilities, I believe a large number of small industries may crop up. This development of small

industries, side by side with the improvement of agricultural industry, will go a great way in diminishing the difficulty which frequently arises out of scarcity due to occasional failure of crops. This will be specially noticeable in joint agricultural families.

Q. 2.—Capital for industrial enterprises, if not a joint-stock concern, can be acquired from the following sources :—

- (a) Owners' own resources; (b) Credit from the vendors or shippers of materials;
- (c) Bazar money lenders; (d) Dealers for forward contracts; (e) Private parties;
- (f) Local Banks.

If the concern proves to be lucrative, the difficulties of securing financial support from the above sources are not insurmountable.

Q. 3.—So far as I am aware I may mention only one small industry in which the development seems to be unhealthy and abnormal. There seems to be rather too many small trunk and safe making workshops in Calcutta. They make only cheap and inferior class of goods. None of these factories are equipped with up-to-date machines or processes.

Government assistance.

Q. 5.—(1, 2 and 4). I do not think it is advisable to give money grants-in-aid, bounties or subsidies for building up industries. Advances in the shape of loans at a reasonable rate of interest may be given, in deserving cases, exclusively for pioneering new industries. Any financial help accorded to one out of two or more existing industries will be regarded as an unfair and partial action.

(3) Guaranteed dividends may be desirable only for fostering the establishment of new large industries.

(5) I do not think the supply of machinery and plant on hire purchase system is practicable at all.

(7) Government guarantees for purchase of articles from a local factory for a limited period will be a good impetus and of considerable help in the infant stage of new industries. But if such favours are allowed to existing concerns, it should be equally distributed among the competitors in the same line.

Pioneer factories.

Q. 8.—To promote the growth of new industries, it is not essentially necessary for the Government to start pioneer factories. Perhaps the private individual, naturally zealous of his own interest, can work out a factory more successfully than a factory manager appointed by the Government. Hence if loans are granted to deserving parties in the following manner Government may be instrumental in building up many new lines of industries, without totally losing the money or directly interfering with the trade and commerce. Among many lines of industries, which should be urgently introduced in the country, I may name, as an example, the manufacture of drawing wires of steel, copper, brass and other metals, as well as its auxiliary lines of wire nails, barbed wire fencings, etc. Wire and wire articles are immensely consumed in this country. But unfortunately there is not a single factory, as far as I know, in all India to manufacture them. I think a capital of two lakhs of rupees would be required to start a factory in this line on a decent scale. The Government may issue a circular, gazetting that if any party with a capital of rupees one lakh can set up a factory and can prove that they are in a position to manufacture wires, etc., and can sell them at a fair price in the competitive market, the Government will consider the question of granting to them a further amount of one lakh of rupees as working capital, repayable within a certain period. The Government will of course exercise some amount of control until the loans are paid off. Should the Government elect to start any pioneer concern, it should be distinctly understood that they should be prepared to sell such concern by public auction to the highest bidder, as soon as it comes to the profit earning stage.

Limits of Government assistance.

Q. 13.—Except in cases of new pioneer industries, all the financial help that the Government industrial banks may grant to the industries, should be done strictly on the present banking system. Securities of plants and stock should be properly appraised, and uniform rates of interest charged, so that rival parties in the same lines of industries may have no occasion for grudge.

Commercial museums.

Q. 28.—Since the starting of the commercial museum in Calcutta, our manufactures are displayed there, but I do not remember to have received any enquiry from that source, except on an isolated occasion from the Dum Dum cantonment. I think if a manufacturer can produce the right thing and make it known to the dealers in that line, that he is in a position to sell it cheap, he should have no difficulty in securing a market.

Exhibitions.

Q. 31.—I doubt the utility of industrial exhibitions, as I believe our factory industries have not as yet come to that stage of efficiency. As regards cottage industries I think the exhibitions held in the past, have done more damage than good to them because these exhibitions were, to some extent, responsible for giving birth to factories in foreign countries, equipped with automatic machines for imitating the manufacture of the same articles at a much reduced cost.

Trade representatives.

Q. 34.—I think the industries of India, except perhaps the textile, are not developed enough to require the appointment of trade representatives. A system of commercial travellers in India may be helpful to the indigenous industries.

Q. 37.—The publishing of the list of articles, used by the principal Government Departments, should be a source of great help to many industries. Every facility should be given for the inspection of samples of stores required by the Government.

Q. 39.—The proposed industrial banks may extend their facilities in marketing indigenous products. Financing agencies.

Qs. 44 and 45.—The labourers' efficiency and skill, in generally or in particular industries, can be improved only in factories under expert supervision. Piece-work, increment, promotions, money prize and such other factory systems are very helpful in the making of an efficient workman. I believe picked men, recruited from new coolies, can be trained to work on any machinery. Training of labour and supervision.

Q. 46.—I have found expert mechanics can be made out of apprentices trained in factories or workshops.

Q. 47.—Industrial schools are necessary for making foremen and mistries.

Q. 50.—Industrial schools should be under the Department of Industries which is expected to be more in touch with the practical field of work than the Department of Education.

Qs. 51 and 52.—Supervisors of all grades should have some academic education and also pass through technical schools. His real career should begin from the bottom of the ladder of a factory. And I believe skilled managers will come out themselves from the rank and file. If they are found efficient and promising it is to the interest of the factory owners to send them to study conditions and methods in foreign countries.

Q. 64.—The formation of an Imperial Scientific and Technical Department with provincial branches may be of great assistance to the industries, if properly equipped and administered. Technical and scientific departments.

Q. 71.—I think the technological research institutions should be general in their interest and be maintained as provincial institutions. But instead of being only a professorial or official body, aloof from the public, they should be in closer touch with the workshops, factories, trades and the bazar.

Q. 79.—Reference libraries of technical, commercial and scientific books, most up-to-date in character, is a great desideratum.

Q. 80.—A commercial college, where commercial travellers and business men may be trained, will be useful. It should not be confined to training only typists and clerks.

Qs. 82 and 84.—We have often received various information from the Commercial Intelligence and Statistical Departments. We wish that their scope of utility may be widened by way of greater dissemination of information through publications and other channels, and greater facilities should be given availing of their publications. The Departments should be more popularized than they are now. Commercial intelligence.

Q. 87.—It is doubtful whether sufficient publicity is given to these monographs, forest bulletins, agricultural ledgers, etc. Presumably many good things have been done by Government in this direction but very little advantage is taken of these publications by the public, because they are not sufficiently made known to them.

Q. 98.—Special railway transport facilities and rates are very imperative in the development of industries. Existing railway freights are prohibitive and are in the way of developing the indigenous industries. For instance the freight to-day for shipping canned fruits from Calcutta to London is cheaper than the railway freight from Muzaffarpur to Calcutta. There are many raw materials, abundant in Rajputana or say in Mysore, which we cannot bring to Calcutta at the same rate of freight at which they are taken to Hamburg or Hull. The principle on which the tariffs in India, on railways, are calculated, viz., the waggon load and long lead should not be made applicable in the case of goods manufactured in India. Railways.

ORAL EVIDENCE, 28TH NOVEMBER 1916.

Mr. C. E. Low.—Q. Are you manager of the Bengal Galvanising Works?—A. I am senior partner of the firm. It is a partnership between us brothers, not a public company.

Q. How long has it been going on?—A. Since the last ten years; it started in 1906.

Q. What gave you the idea of starting such a concern?—A. I went to the Paris Exhibition in 1900, and met a gentleman who told me to come to England where he would teach me galvanising. At Staffordshire I learned galvanising. When I came to India I had not sufficient capital to start, but did some commercial business, made money and started the business.

Q. You made enough money?—A. I started with only Rs2,000 and had hand machines.

Q. Now you have got larger machinery?—A. All power machinery; we use electric power.

Q. You take that from the Corporation?—A. Yes.

Q. Do you get it on reduced rate?—A. Yes, two annas flat rate.

Q. Did you find it difficult to finance your industry?—A. Of course we sometimes had to go to Marwari moneylenders. That was in the old days. Now we have made money out of the business which is very successful.

Q. Whom do you sell your goods to?—A. We sell in the open market to dealers, those who imported these galvanised goods. They are the distributors of these goods.

Q. You entirely sell to wholesale dealers?—A. Yes, never to the consumer. We never spend a farthing over advertising. Sometimes we sell on forward contracts.

Q. You are finding it rather difficult to get zinc at present?—A. Now there is no supply from Germany. We are using match box zinc. All the match boxes come packed in zinc sheets, which have 98 per cent. of pure zinc, and we buy and melt these sheets.

Q. You are in favour of industrial banks?—A. Yes.

Q. Supported by the Government?—A. Yes.

Q. Where would the bank draw its capital from?—A. Government may purchase some shares, or guarantee dividends, or a deposit of public money might be invited. Government guarantee would be enough for the purpose.

Q. You think, without the Government guarantee, the public support would not be forthcoming?—A. Yes. Since it would be an All-India Bank, the head office may be in Delhi, but we should have branches at the chief trading and industrial centres, and these branches should have sufficient power.

Q. I see you propose in one place that Government might get rid of the pioneer factory by selling such concerns by public auction to the highest bidder, as soon as it comes to the profit-earning stage. Supposing the highest bidder was a foreign firm, who only bought it to close it down?—A. I never thought of that. There would be a difficulty. Of course I mean that Government should not lose anything over it but offer it to the highest bidder.

Q. Provided that the buyer is not likely to act against national interests?—A. Yes.

Q. Have you any educated men acting as your employes?—A. Those that are foremen and headmen; they are educated. They have had a technical as well as academical education, and possess practical knowledge. We get on well with them.

Q. What technical education have they got?—A. They served as apprentices in some engineering firms. Academically they have passed their Matriculation.

Q. Did you try to get workmen with some technical training?—A. No, we just took raw men and gave them some training in our works. That is the best field for technical knowledge.

Q. Have you any apprentices?—A. There are ordinary workmen apprentices in our workshops.

Q. I mean educated men taken on as apprentices?—A. Up to now we have had no occasion. If any are recommended to us, we are ready to take them.

Q. You say, "We have often received various information from the Commercial Intelligence and Statistical Departments"; on what particular matters?—A. On various subjects. We are Tata's selling agents for iron and steel, and they send enquiries to us to make in the market. We write to the Intelligence Department and get replies. We make enquiries about brass and other things.

Q. And do you get prices from the Commercial Intelligence Department?—A. We enquire ourselves in the market, as we cannot rely on the Commercial Intelligence reports, on prices of things.

Hon'ble Pandit M. M. Malaviya.—Q. You would have one industrial bank at Delhi and branches in the different provinces and important centres of trade?—A. Yes.

Q. Would you recommend that Government should take shares in that bank, say for a number of years, and allow the interest on those shares to go towards making up the dividend that may be guaranteed?—A. I think that would be a good course.

Q. You are in favour of industrial schools. At what age would you begin industrial education for boys and girls?—A. After they have passed their Matriculation.

Q. Don't you think it would be enough if they passed the upper primary examination?—A. I mean they should have some sort of general education before they begin industrial education.

Q. Would you admit them at the age of 12 to the industrial school?—A. 12 or 14 would be better.

Q. Up to that time they should have received a general elementary education?—A. That is very important.

Q. Would you make drawing a part of the general education?—A. Yes, that is very important too.

Q. In regard to railway rates, have you made any representation to the Railway Board?—A. I never made up to now, but I know it is a fact that there are certain markets which I should have controlled by my manufactures, but cannot do so on account of railway freights; markets like Cawnpore and Allahabad which are controlled by Bombay. My goods should have gone there.

Q. Are you sure that you cannot bring raw materials from places in Rajputana to Calcutta at the same rate as they are brought from Hamburg?—A. Yes.

Hon'ble Sir Fazulbhoj Currimbhoy.—Q. You depend entirely on foreign raw materials for your manufacture?—A. At the present moment not entirely; we are dependent for steel sheets, but rods we are getting from Tata's. Tata will be manufacturing these sheets in the course of a few years. Even by being dependent we are in a position to compete with Europeans in their own field.

Q. How would it do if in place of having your factory in Calcutta you had it in Tata's works at Sakchi?—A. No, there would be various other expenses much heavier. I would have to bring down goods by railway, while I am bringing them now by sea which is cheaper.

Q. Then you will have to depend on the foreign market for your materials?—A. The manufactured goods will occupy more space than the raw materials; usually they come in for 12/6d., whereas manufactured buckets have to pay 25s.

Q. You will have to depend on Germany for zinc?—A. No, Australia is going to make it now and Japan is already making.

Q. You say about industrial banks, "on the lines already indicated by certain witnesses"; what is your opinion?—A. I say we should have some sort of industrial bank to give us advances on the security of stocks and plant.

Q. You don't get money on plant from any bank?—A. We used to get from the Bengal National Bank, but now we don't owe them anything.

Q. You say, "I do not think it is advisable to give money grants-in-aid, bounties or subsidies for building up industries, etc." Do you know how Japan and Germany became industrially great in the world?—A. I don't know exactly, but my belief is that it is no good helping a man to run if he cannot stand on his own legs. We have some natural advantages in our market, we have a certain amount of materials, and cheap labour and supervision.

Q. Can you get experts cheap? Why bring out experts?—A. We can go and pick up knowledge in Europe.

Q. Have we got facilities to become experts in Europe; do they take us?—A. No one can deter us from going and acquiring knowledge on any subject, if we make up our mind to do it.

Hon'ble Sir R. N. Mookerjee.—Q. You are against the supply of machinery on the hire-purchase system; why?—A. When we want a particular machine we enquire of all countries what is the best machine, and we fix up the price and get one, but with the Government there may be some misunderstanding. The Director of Industries may recommend a certain machine that I do not require.

Q. You have not got money and you want Government help but you object to Government supplying machinery on the hire-purchase system. What objection have you got to this?—A. I am afraid that it will not be practicable; there might be a difference of opinion as regards the maker of the machine or the size.

Q. If a man indents for a certain make Government will get that?—A. Then it is all right.

Q. Then you withdraw your remark?—A. Yes, on that condition.

Q. Are you afraid of competition? Because you have been an exceptionally fortunate man in your industry, you therefore don't want anyone to get help from Government?—A. No, why not let them take the industrial bank's help.

Q. If you were not so successful, would you still say that you do not want Government help for the development of Indian industries?—A. I think it would be of little use to help one until he can exert something of his own powers.

Mr. A. Chatterton.—Q. I should like to get from you the history of your enterprise from the time when you started with hand machines, so as to see how the industry subsequently developed. Will you send us a short note on it? What is wanted are particulars of any difficulties which you experienced and got over, and which at the time, if there had been a Government organisation, you might have had help from. We would like to know some more details on that point, because I noticed in the first few lines of your evidence that you state "it would be easier under the present conditions of India to devise a scheme for the development of industries on a proprietary rather than on a joint-stock basis?"—A. I shall send in a note.*

WITNESS No. 86.

BABU HEMENDRANATH SEN, *Vakil, High Court, Proprietor, the Calcutta Pottery Works, Calcutta.*

WRITTEN EVIDENCE.

So far as our business, *viz.*, the Calcutta Pottery Works, is concerned, the capital financial aid originally required for the business was contributed by us, the three proprietors, *viz.* Hon'ble Maharaja Sir Manindra Chandra Nandy, K.C.I.E., Rai Baikuntha Nath Sen Bahadur and myself. But after investing over two lakhs of rupees when we thought of opening accounts with the Bank of Bengal on cash credit system up to Rs. 50,000, we met with considerable difficulty, as the bank would not open such an account with our concern. But they ultimately agreed to do it with us individually as partners with a solicitor as our guarantor. Every facility should be secured for respectable firms to open such accounts with banks, otherwise it is not possible for any industry to prosper. Then last year, when we found from our experience of the previous sixteen years, that this is a business in which the larger is the capital invested, the greater the profit, we approached the Bengal Government with a proposal to convert our firm into a company of limited liability with a Government guarantee of a 5 per cent. dividend, as we thought that this was the best and surest method of inducing capitalists

* Not received at the time of going to Press.

in this country to invest their capital in industrial enterprises. We had reasons to come to such a conclusion. We know that there is no lack of capital in this country—in fact a very large amount of money is lying hoarded in Government promissory notes or even uninvested, and the owners are most reluctant to invest their money, as they have no confidence in the success of industrial enterprises carried on by us, the Bengalis. The sad experience of the last few years in the failure of several industrial enterprises started by the Bengalis strengthened the suspicion of the capitalists, and it is my firm conviction that unless some enterprises prove successful, the apprehension of the capitalists will not be removed and the capital of the country will continue shy. So with a view to create hope and confidence in the minds of the capitalists, every possible endeavour should be made to make existing business successful or to start such new industries under such arrangements as are bound to prove successful. With this in view I think a Government guarantee is one of the methods which is likely to prove attractive to the capitalists. A guarantee of 5 per cent. will induce the holders of Government promissory notes at 3½ per cent. to convert their notes into capital and invest it in industrial enterprises. Of course, we cannot ask the Government to guarantee any dividend unless they are satisfied that the existing firms or new firms which they propose guaranteeing, fulfil the conditions which guarantee success. If a few such enterprises prove successful it is my firm conviction that the capitalists will invest their capital willingly and continually.

The above is one of the methods by which the capital for industrial enterprises may be raised from individuals. But there is another method by which industrial enterprises can be helped with capital, viz., by creating facilities for opening accounts with banks, for the supply of the necessary funds to carry on business. If my information is correct, all the big mills carried on by European firms are indebted to some bank or other for several lakhs of rupees, and as a matter of fact no big mill can work unless there is some bank to render financial help. Those who started some industries had no such facilities and consequently had not the timely pecuniary help which is essential in every industrial enterprise. Hence the movements started have met with failure.

Government
assistance.

Q. 2.—So far as I am aware, the few industries which were started during the last few years had their capital principally supplied by the members of the legal and medical professions and some philanthropic landholders, who believe that the industrial development of the country is the best means of increasing the wealth of the nation. I am not aware of any direct financial aid of Government to any existing industrial enterprises, except the negotiation that is being carried on between us and the Bengal Government for helping our business by guaranteeing a dividend of 5 per cent. with subsequent refund to Government of the expenditure incurred, if any, in paying dividends at the guaranteed rate.

Q. 5.—As regards the different methods of giving Government aid to existing or new industries, my submission is that this will depend upon the particular requirements of each industry. Each of the methods suggested in the seven items of question 5, may prove beneficial to any particular industry and the method should be decided by Government in each individual case. So far as our industry is concerned I have already submitted that if the Government is disposed to give us a guarantee of 5 per cent. dividend for 10 years, with subsequent refund to Government of the sums advanced, if any, I think enough capital will be forthcoming and we have every reason to hope that our business, when converted into a company with limited liability and Government guarantee, will be able to declare a highly satisfactory dividend.

Of all the methods suggested in the question I think this is the most efficient and unobjectionable method, for if the condition is to refund the money advanced by Government there cannot be the slightest objection to such advances on the ground that public money should not be used for helping a certain individual or body of individuals. Each one of the method suggested in the question is effective and if any industry is in need of any particular methods of help, Government should unhesitatingly do it, for without such help the industrial development of this country at this initial stage is an impossibility.

In my opinion there should be Government control in some shape in each and every one of the methods suggested in the question. Government control in some shape is sure to prove healthy for the development of the business and it will operate as a check on maladministration and misappropriations which are likely to happen in industrial movements in their infant stage. If any business is carried on in a proper way and honestly, there need be no apprehension of any control whether it is of Government or any body with superior knowledge and experience. The gentleman representing the Government will naturally be one with industrial education and experience of business, and his control is sure to prove beneficial to any infant industry carried on by gentlemen without any industrial education or experience of business.

I think the appointment of Government Directors with defined powers for the period during which the direct assistance lasts, should be the form of this control.

Pioneer factories.

I have got no experience of a Government pioneer factory but I think it will be a wise move if Government would start a *glass factory* in this country. I know several endeavours were made to start a glass factory in Bengal, and a glass factory known as the Himalayan Glass Factory worked for some years, but ultimately it failed. So it seems to me that the difficulties in the way of starting a glass factory are such as our people are unable to cope with. On the other hand, the demand for glassware is so enormous

that it is highly desirable that a pioneer glass factory should be started by Government. A very large quantity of glass articles is imported to this country, and an equivalent amount of money is sent out of the country. So if a glass factory proves successful it will prove beneficial to the country in various ways. The raw materials are available in this country. I will deal later with the principal raw material for glass manufacture.

Experts in glass manufacture are not available here but it will not be difficult for Government to secure such experts from foreign countries, and if young men with scientific education are trained in the business and are taught the trade secrets, the time will come when private individuals may also start smaller factories.

At what stage should such a pioneer factory be closed or handed over to private capitalists or companies is a question which it is hard to answer now, but it will rest with the Government to adopt either of these courses when Government is satisfied that such a business can safely be entrusted to individuals who by their special knowledge and experience of such a business appear capable of managing successfully such a factory. If proper safeguards are made and adequate measures are adopted against possible failures, Government will be doing a benevolent act by handing over such successful business to private individuals or companies.

There is another industry which is at least equally important, as it concerns the daily food of the whole nation—I mean the sugar industry. Sugar is a commodity which is very largely used by almost the whole population, and although some attempts were made to start a sugar factory, so far as my information goes there is no successful factory in this country. I am aware of the Tarpur Sugar Factory and I am aware that many of my countrymen have already spent large sums of money over this business and they are even now struggling with it, but I do not know how it will succeed ultimately, unless Government is disposed to help them. Having regard to the fact that it is a commodity which is daily used by this vast population, I think Government ought to take up this industry and either start a pioneer factory, or if possible, help the Tarpur factory with such assistance as may crown the enterprise with success.

Q. 11.—As regards co-operative societies my experience is limited only to the co-operative society which we have formed in our factory and which is proving highly beneficial to our workmen. They have been saved the harassment of professional money lenders, especially the Kabuli tradesmen. They borrow money, when necessary, from the society on reasonable interest and pay off their debts by instalments in accordance with the rules of the society. Judging from experience, I think, the larger establishment of such co-operative societies will contribute towards the improvement of industrial undertakings in general.

In my opinion the commercial museum established in Calcutta has done immense good in assisting the sale of manufactured articles. It is an excellent advertiser and it affords facilities both to the sellers and buyers. So far as our business is concerned, since the museum was opened, we have received numerous enquiries regarding our manufactured articles exhibited in the museum and we have secured several customers thereby. I venture to suggest that if such commercial museums be established in every mofussil district town, at least in those towns where exhibitions are not held at all, they will prove of great benefit to the industrial movement, as they will serve as a most suitable place for the sale or display of the products of minor cottage industries. The public will be able to know what particular articles are locally produced and by whom, and thus it will encourage the producers and will give opportunity to those who are disposed to encourage indigenous industrial productions for taking up such business and if possible, starting business in a regular form.

The exhibitions also are of great value towards the industrial development of the country. By awarding medals and prizes and certificates the exhibitions are encouraged and the public have an idea of the articles that are locally produced. Pecuniary help from Government may not be necessary in opening such exhibitions, but the patronage of the Government, especially of the local Government officials is absolutely necessary in order to make these exhibitions successful. In every mofussil district wherever such exhibitions are held generally the officials co-operate with the organisers and the result proves satisfactory. But I think of late there has been a tendency in many exhibitions to hold amusements, such as bioscope shows, theatrical performances, *jatras* and *nautches* with a view no doubt to make the exhibitions attractive and popular. But in some cases the attention of the organisers is directed to the amusements at the expense of the exhibition and the things exhibited. Care should be taken to discourage such a tendency.

Q. 37.—In my opinion, the principal Government departments should be directed to exhibit the imported articles which they use in the commercial museum, so that it will be useful to compare them with similar articles manufactured in this country when placed side by side with the imported articles. This will help the local manufacturers in improving their quality when necessary.

The crying need of the country is the establishment of industrial and technical schools. If India is so hopelessly backward in the industrial world, it is principally, if not wholly, due to the absence of any organisation for imparting industrial and technical education to the people of the country. All the young men study for the legal and medical professions, and, when unsuccessful, they are obliged to become clerks in offices. They have no means of acquiring an industrial and technical education. It is thus that the Bengalis are ridiculed as a "nation of clerks." Hitherto no regular systematic attempts have been made by Government to

impart industrial and commercial knowledge to the people of this country. As a result of the *Swadeshi* movement a national technical school was established, but as there was no Government recognition, no Government patronage, no connection with the Government, guardians naturally felt disinclined to allow their boys to join the institution. The result was inevitable and although the school exists, still in name, no practical or useful purpose is being served by it. Unless and until the parents and guardians are satisfied that their boys, when successful at such an institution, will be employed by Government, or such offices or establishments as are patronised by Government, they will not permit their boys to join the institution, however well staffed or well managed it may be. So, to my mind, it is absolutely necessary that Government should establish schools for imparting industrial and technical education and for training labour and supervision.

Q. 50.—The Department of Education with its numerous colleges and schools and institutions is already so overworked that I am afraid necessary attention will not be given to industrial and technical education, if the schools are placed under the Education Department. I think a separate Department of Industries should be established and when the Bachelor of Commerce degree is introduced in the University, a proposal for which has been set on foot, I think those qualified for such degrees from the said school should be graduated by such rules and regulations of the University to be adopted after due deliberation with competent authorities.

In my factory I have both literate and illiterate workmen and as is to be expected the former class work more efficiently than the latter. Of course, it is different in the case of workmen who derive skill by heredity. In my factory I have got a boy, who is a potter by caste aged only 9 years, who is working much more efficiently than his elders who are not potters by caste. I am introducing a night school in my factory for the improvement of the labourer's skill and efficiency, and I think night schools should be preferred to day schools for obvious reasons.

General.

Q. 110.—As I am interested in the pottery and porcelain and earthenware industry my suggestion is that there is a very wide field for business in this particular industry. The statistics of a few years will show that enormous sums of money are being drained out of this country every year by the import of porcelain and earthenware goods. Ours is the only factory in the whole of India in this line of business. We have struggled for the last sixteen years and we have satisfactorily shown that it is a profitable business, although we have gained this experience at enormous cost, as is everywhere the lot of the pioneer manufacturer. By converting our concern into a joint stock company with limited liability with the Government guarantee of a dividend of 5 per cent. the negotiation for which is going on, I hope we shall be able to satisfy our countrymen that it is possible for us to carry on business on joint stock principles even in such an entirely new industry. No doubt, my countrymen are carrying on business successfully on joint stock principles in tea and coal, but ours will prove that we are capable of achieving success even in an entirely new line. So my humble suggestion is that Government should give effect to our representation and thus encourage honest and strenuous efforts for the industrial development of the country. We get all our raw materials in this country and that is a special advantage for our business.

Q. 111.—As already stated India stands in urgent need of a glass factory. There is none in India at present and many previous endeavours have failed. So it behoves our Government to take up this industry, for which field is very wide and for which two of the essentials necessary for any industry—raw materials and market—exist in this country. As for the market, the statistical reports will show how many crores worth of glassware are being imported to this country. As for raw materials sand forms one of the principal raw materials for glass manufacture. I desire to bring to the prominent notice of the Commission the fact that we, the proprietors of the Calcutta Pottery Works, are the owners of an inexhaustible stock of quartz sand which has been declared by eminent chemical analysts after careful analysis "as pre-eminently fitted for glass manufactory." The sand is available at a place near Rajmahal, the nearest railway station being Taljhuri on the loop line, East Indian Railway, and the stock is so large that it will be sufficient for generations. The other element, labour, is no doubt a difficult matter to deal with, for this industry requires special expert knowledge and skilled labour. But if the Government will kindly take it up, there will be no difficulty in securing experts from foreign countries. The climate, no doubt, is a very serious question, but India possesses almost all the different climatic conditions of the world, so it will be necessary with the help of expert advice to select the best region for the location of the factory. I appeal to the Commission for an investigation about this quartz sand particularly, as it is useful in another trade or industry. Sand is very largely used in buildings for plastering purposes and saltpetre is the great curse of all sandplasters. This quartz sand has been declared after most careful and exhaustive examination and analysis by some of the most eminent chemical analysts in Calcutta, such as Dr. Schulten, Captain Bedford, Dr. Waldie and others, to be absolutely free from saltpetre. Besides that, it is proof against damp and requires less lime for plastering purposes than ordinary sand. This quartz sand is therefore pre-eminently suited for plastering purposes, but the railway freight has made it impossible for the proprietors to carry on trade successfully. The railway freight is so prohibitive that the proprietors have incurred heavy losses by trying to carry on this trade by rail from Taljhuri to Calcutta. If the Commission will remove this freight difficulty, a successful industry will be carried on to the benefit of all concerned.

As regards the raw materials and railway freight generally, my submission is that the Commission should take up this matter in right earnest. Almost all industries are suffering because of the prohibitive railway freight in carrying raw materials. So far as my information goes, in all civilized countries, railway authorities grant special rates to manufacturers for carrying raw materials and without that no manufacturing industry can possibly succeed. But unfortunately in this country, whenever we have approached the Government with our prayer, we have the stereotyped reply, "There is the Railway Board," and that body is hard to be approached by any particular individual or manufacturer. So the attention of the Commission is particularly drawn to this question of railway freight which is proving disastrous to many industries.

ORAL EVIDENCE, 28TH NOVEMBER 1916.

Mr. C. E. Low.—*Q.* Is the Calcutta Pottery Works a limited company or a private concern?—*A.* It is a private concern belonging to myself and two others.

Q. Why did the Hon'ble Sir M. C. Nandy, Maharaja of Kasimbazaar, take an interest in it? Is he a friend of yours?—*A.* Yes. I asked him to join it and he joined.

Q. How long has your concern been working?—*A.* It began about 20 years ago.

Q. Was that before you were connected with it?—*A.* I was connected with it from the very beginning. A friend of mine discovered the kaoline clay at Rajmahal. It was about 20 years ago. I took up the idea and started in a crude form. After a few years we got hold of a Brahmin gentleman who had absolutely no special education for this industry. Still he had some ideas about it. With his help we went on for about 6 or 7 years. At that time we spent a lot of money and could not do anything. Fortunately Mr. S. Deb came in from Japan and we got hold of him, and we really began in right earnest in 1906 or 1907. Since then we have placed the entire business in his charge. We sent him again to Japan, and we brought 2 Japanese workmen. Mr. Deb was sent to Germany and we kept him there for 5 years. He came back just before the outbreak of the war.

Q. You seem to have spent a good deal of money. I hope it is realising profit?—*A.* It is realising now, and I may tell you that my last balance sheet showed a profit of 9 per cent.

Q. You wanted to open accounts with the Bank of Bengal, on the cash credit system. You were not able to do it on your partnership?—*A.* I had difficulties and that is one of my grievances.

Q. The Maharaja of Kasimbazaar could get credit anywhere. Could you as a private individual have got credit with the Bank of Bengal?—*A.* I do not know.

Q. Do you think it would be more difficult then to get money for the industrial concern under a partnership than you would as a private individual?—*A.* That is the complaint I have made.

Q. Would that same thing apply in the case of Europeans?—*A.* I cannot tell you.

Q. What is your opinion?—*A.* I think they have had these difficulties too. I am not in a position to give any concrete instance.

Q. That is your impression?—*A.* My information is that all these big mills, who are doing very lucrative business in Calcutta, have all got their accounts with the banks. That is my impression.

Q. How does it work in the case of Europeans starting a small concern under partnership?—*A.* I cannot tell you.

Q. I understand that you have now approached the Government of Bengal?—*A.* We have now found from our experience that ours is a business, in which the more is the capital invested the more will be the profit. That is why we have approached the Government of Bengal. If we get very large capital, and convert the concern into a limited one capital would come in, and a very large profit will be made.

Q. Are you prepared to submit your accounts to Government inspection?—*A.* That we have done, and they have made a report. I understand it is a fair report.

Q. Then the position is this. You have a successful concern which has been making profit for some time, which has been guaranteed by men of high reputes, but that it has been unable to go to the public, and ask them to subscribe without a guarantee?—*A.* That is my position. My reason is this. If I were to convert my firm into a limited liability company, I am afraid, private capital would not be forthcoming, because of the many failures we have recently encountered. You are aware that of late many industries were started by our countrymen but unfortunately they did not meet with success. That created suspicion and apprehension in the minds of the capitalists. That is why we approached the Government. If Government were pleased to give us a guaranteed dividend of 5 per cent. the capitalist I think would come in, and invest his money.

Q. You say that 5 per cent. should be given. Is that generally given in the market?—*A.* I have at present to satisfy the capitalist. The people are investing money in Government promissory notes. They do not get more than $3\frac{1}{2}$ per cent. If they get Government guarantee at 5 per cent. that would attract capital. The Government guarantee would be a safer inducement for the capitalist.

Q. You find the investing public just as distrustful as the bank?—A. Yes.

Q. Have Government put on any expert to examine your business?—A. Yes. Messrs. Lovelock & Lewes have audited our accounts and some one having special knowledge has examined our business on behalf of Government.

Q. You have had some experience of the commercial museum and I am glad to learn that it has been of assistance to you?—A. Very much.

Q. Do you think that it should be provincialised, that is to say, there should be one here, one in United Provinces and so on. Do you think that it would give you and other manufacturing firms an opportunity of making their goods more widely known?—A. Yes.

Q. How did you get hold of employees for your factory?—A. That is Mr. Deb's look-out. He had to train them. This is the first pottery factory in India. Mr. Deb had very great difficulty in securing experts. We could secure potters. We require men with special training for the moulding business. He has taught many and now we have got a sufficiently large number who have learnt the business, and we are thinking of opening a night school in connection with our factory to get apprentices.

Q. Do the labourers stay with you for a long time or do they change very often?—A. So far as I know, there is not much change. Only one gentleman whom we taught at much expense has left us, and has joined the Gwalior factory.

Q. The labourers do not change?—A. There is no other porcelain factory in any place in India. That is the reason.

Q. Do they go away to Eastern Bengal in connection with the jute industry?—A. They do not go.

Q. From what class are the labourers drawn?—A. They come even from the Bhadrakal class. Besides there are potters.

Q. Do they come from Krishnagar?—A. Yes, and from up country also.

Q. Are your employees literate?—A. Yes.

Q. You find that a little education and some intelligence make a lot of difference?—A. Exactly.

Hon'ble Pandit M. M. Malaviya.—Q. Was it the first time that you found it necessary to go to the Bank of Bengal in this connection?—A. Yes.

Q. The solicitor who was your guarantor was not a member of your firm?—A. He is a friend.

Q. Then the bank would not advance you money on the security of your concern plus the individual responsibility of three partners of the firm?—A. Yes, although one is a Maharaja.

Q. Was the solicitor an Indian gentleman?—A. Yes.

Q. You say that so far as you are aware all the big mills carried on by European firms are indebted to some bank or other for several lakhs of rupees? That is my information.

Q. Has money been advanced so far as you are aware to European mills?—A. I cannot give you the details. I am simply informed that they have got accounts.

Q. What is the exact proposal that you have to send up to Government? Is it that they should guarantee a 5 per cent. dividend and that the money given to you by government is to be returned to them out of your profits? How would they be satisfied about the return of the money?—A. I have asked the Government to be satisfied that the money would come back, and whether we shall be able to do it or not.

Q. Merely on the ground that your business promises to be a success you have asked the Government to guarantee a dividend?—A. Yes; it may be that the Government may not have to advance any money at all when I make more profits later on. The name of the Government will be attractive.

Q. You say that there cannot be the slightest objection to such advances on the ground that public money should not be used for helping a certain individual or body of individuals? There seems to be no objection to that. Why should Government money be given to any particular individuals?—A. If I give them a guarantee that I shall pay back, then there can be no objection.

Q. In addition to that would you not give some other guarantee that the money would be refunded even if the concern is not successful?—A. That is not the proposal.

Q. You say that the crying need of the country is establishment of industrial and technical schools and you also say that you have found in your factory that those who are literate are better than those who are illiterate and that you have introduced night schools?—A. I am thinking of introducing night schools.

Q. Do you think that if the boys and girls before they went to the factory received general education they would be more efficient?—A. That is my idea.

Q. You think that there is room for developing this pottery and porcelain earthenware industry to a great extent?—A. Certainly.

Q. And you think that if Government gave some encouragement people will have confidence and the industry will develop largely?—A. That is my own idea.

Q. In regard to railway freight have you made any representation to the Railway Board?—A. I saw Mr. Dring myself. Babu R. K. Bhattacharjee

Q. With what result?—A. He told me that they could not do more than what has been done already by the Railway Board.

Q. You have made no subsequent representation to the Railway Board?—A. No.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. When you went to the Bank of Bengal for Rs. 50,000 what securities did you offer?—A. The premises, the machinery and the plant.

Q. Suppose you wanted this money in two different names, such as yourself and the Maharaja, don't you think you would have got it instead of the solicitor?—A. I have seen their printed form. The form requires that there must be a guarantor.

Q. Can you tell us whether the other companies get their money on the raw products?—A. I have got no experience.

Q. You have sent proposals for guaranteeing 5 per cent. Have you formulated a scheme of a limited company?—A. That we have left to the projectors, who will be the managing directors. We have not now any managing director. We have simply submitted our proposals.

Q. Supposing you turn your concern into a limited company with a big capital, you must have a prospectus?—A. That would be later on when we get Government assurance.

Q. Don't you think that before sending up the thing to Government you must have a prospectus?—A. We have not yet come to that.

Q. If you can show to the public that you can make 9 per cent. profit and supposing you have a moderate commission and if no royalties are charged, do you not think that the public would come in?—A. No. That is my impression.

Q. Have not the jute mills a lot of Bengali capital?—A. That is because that they are managed by firms who are sure to make profits.

Q. Because they are managed by Europeans?—A. Exactly. That is why they have got confidence.

WITNESS No. 87.

BABU RAJANI KANTO BHATTACHARJEE, *Pleader, Director, representing the Rangpur Tobacco Company, Limited, Bengal.*

WRITTEN EVIDENCE.

I raised capital for the Rangpur Tobacco Company, Limited, a concern which manufactures cigarettes, snuff, plug tobacco, mixtures, etc.

My difficulties in raising capital were chiefly :—

- (a) Want of confidence in the business capacities of the promoters.
- (b) Doubt as to the ultimate success of the venture.
- (c) Indifference of landholders, traders, shop-keepers in short wealthy people in general.
- (d) Apprehension on the part of some zemindars and Government servants of incurring the displeasure of Government by subscribing to capital of the company.
- (e) Comparative poverty of those who were willing to assist the enterprise by subscribing to its capital.

These difficulties I think will be removed by direct Government connection in one or more of the ways indicated in question 5.

In my experience the following are the sources from which capital for industrial enterprises is principally drawn :—

- (a) People following the learned professions, i.e., legal and medical.
- (b) Service holders.
- (c) Government pensioners.
- (d) Poor educated middle class gentlemen.

I am of opinion that, except money grants-in-aid, the forms of assistance indicated in question 5, either singly or in combination, according to the necessities of each individual enterprise, should be given and in each case there should be Government control in the ways as noted below :—

- (i) Government experts, or Director of Industries appointed by Government, or his assistants, or some local executive officers of Government, should be appointed extraordinary directors with defined powers of supervision, direction and advice.
- (ii) A Government auditor should be appointed for periodical auditing of accounts.

I think Government should, in the first place, make a general survey of the Pioneer manufactured articles imported into the country and start pioneer factories at suitable places

for the manufacture of those for which local produce can be utilized. These pioneer factories should, after they have proved successful, be handed over to private capitalists or companies on their guaranteeing to work them for the purpose the Government originally had in view.

I do not approve of the conversion of successful pioneering experiments into permanent Government enterprises.

financing agencies. In my experience all new industrial ventures are hampered by the conditions under which they are at present financed. I know specially of one case, the Rangpur Tobacco Company, Limited, which the local banks and some of the Calcutta banks declined to finance and I had to start a new bank for financing this concern, and this also has declined to give it further financial assistance. I think it is not possible to give more financial assistance to industrial ventures by existing banking agencies. New banking agencies, I think, should be started with the direct object of helping industrial ventures.

its of Govern- Government assistance should be limited to the utilization of local produce and its
t assistance. improvement by manufacturing it into finished products in places—

(a) where there is no such manufacture, or

(b) where there is such a factory but it has not been successful and there is a reasonable chance of its being successful.

I think there should be no limitation on Government aid to a new enterprise if it competes with an established external trade.

technical aid. I do not think the loan of Government experts to private firms or companies would be of much use.

research abroad. I think there should be a Research Institute in India centrally situated for the present. Gradually it will be necessary to have a Research Institute in every important province. In addition to this, provision should also be made for research in special subjects. I think research in England in addition to research in India, would be advantageous because there will be more scientific men available in England and because the scientific men there are more in touch with modern scientific investigations all over the world.

I do not think the Advisory Council for Research in the United Kingdom can give much assistance to Indian industries because conditions climatic or otherwise greatly differ.

I do not think any college in India has such modern scientific and chemical laboratories as will enable it to carry on the research investigations necessary for the solution of industrial problems.

keys for indus- I think the existing knowledge of the available resources of the country require to
l purposes. be supplemented by further survey and it should be carried on by a Department of Industries specially created. Its object should be to assist people willing to start industrial ventures or to supply information to Government for starting pioneer industries.

commercial The commercial museum in Calcutta is a useful institution. I think it should be
museums. further developed and gradually others instituted, one being situated at the headquarters of each district, if possible. In my experience and opinion there is a great need of sales
as agencies. agencies or commercial emporia for the sale as well as the display of the products of minor and unorganised cottage industries. In my opinion there should be in each presidency town an agency under Government control and guarantee.

exhibitions. Industrial exhibitions are very valuable inasmuch as they disseminate the knowledge of industrial products, their sources of manufacture, stimulate a desire for starting industries and help in advertising. I think Government should take measures to hold or encourage such exhibitions. For some time to come Government should itself hold such exhibitions and recoup itself by fees from visitors; but afterwards, Government may encourage these exhibitions by indirect support.

In these exhibitions all industrial products as well as agricultural, mineral and other products which are closely connected with industries should be exhibited. But to make them attractive other means may be adopted.

trade representatives. Trade representatives should, in my opinion, be appointed in Great Britain, the Colonies, and other countries to represent the whole of India. They should be respectable firms and their duties should be to supply on requisition information as to prices and demands of Indian products or to procure selling agencies if required on such terms as may be agreed upon.

I do not think Indian provinces require any trade representatives being appointed in other provinces. The Director of Industries in each province may give such help as may be necessary.

Government Government departments which use imported articles should publish lists of these
procurement. articles and also exhibit them in commercial museums. I think Government should publish lists of its requirements and try in the first place to have them supplied by local manufacturers. This should be made compulsory.

banking facilities. More banking facilities are necessary for marketing indigenous products. The existing banking agencies are unsatisfactory. Central co-operative credit societies may be utilised or other banking facilities offered.

land policy. I think Government should give more concessions of land for starting new industries. The Land Acquisition Act requires amendment to give more facilities for the acquisition of

lands for industrial enterprises. At present it is discretionary. In every case of a *bond fide* application for the legitimate requirements of a new or existing industry Government should acquire lands on previous deposit of the costs.

I had to train up apprentices in the factory of the Rangpur Tobacco Company, Ltd. I had to train up machine men and other labourers. Training of labour and supervision.

No provincial organisation exists in my province for the development of industries. Official organisation.

I recommend the following organisations for the future development of industries in our provinces.

A Board of Industries presided over by the Director of Industries should be created. It should consist of men capable of assisting industrial ventures, and some experts. The Board of Industries should have executive powers with budgetted funds. It should give help and advice when asked for by industrial concerns, should help these concerns in technical matters, and should start pioneer industries and help in starting new industries. The Director of Industries should be a business man and should have experts as his assistants. The Director should be the President of the Board of Industries and should have a separate department of Government. I recommend the formation of an Imperial Department of Industries which will have general powers of supervision and control over the Provincial Boards.

I know of no organisation of technical and scientific departments at work in my province for the assistance of industries. In order to aid industrial development I recommend the formation of new imperial scientific and technical departments. As for the subjects, that would depend upon the result of the survey of the imports as recommended in the previous part of the statement.

Lack of transport facilities by rail and water do hinder industrial development in my province. Railways or steamer companies do not give any preference to industrial products, even when perishable and the result is total loss of consignments at times. I know of many instances of this kind in connection with the Rangpur Tobacco Company, Ltd. I would recommend the insertion of special provisions in the Indian Railways Act and also in rules and regulations governing railway administration and steamer services requiring them to take special care of industrial manufactures and give special facilities for the despatch of industrial products.

Railway freights are too heavy, nay, prohibitive. I would recommend reduction of railway freight for *bond fide* industrial products.

I know of one instance in connection with the Bengal Forest Department. We required strong wood for caddy boxes for plug tobacco and we asked for the assistance of the Department of Land Records and Agriculture but I am sorry the Forest Department did not help us in the matter.

I have been actively concerned in the tobacco industry. I would like to make the following suggestions for its development:—

- (a) Trained experts capable of manufacturing plug tobacco, tobacco mixtures, and other tobacco products should be brought out and lent to those requiring their services.
- (b) A department of the Scientific Research Institute should be devoted to the scientific treatment of tobacco with a view to help its manufacture.
- (c) Appointment of trade representatives in foreign countries for the introduction and sale of Indian tobacco.

India seems peculiarly suited for the following industries, on account of its resources, labour and market:—

1. Sugar; 2. Paper; 3. Matches; 4. Metals; 5. Chemicals; 6. Dyeing; 7. Glass; 8. Tanning; 9. Tobacco; 10. Jute; and 11. Machinery.

ORAL EVIDENCE, 29TH NOVEMBER 1916.

Mr. C. E. Low.—Q. You represent the Rangpur Tobacco Factory?—A. Yes.

Q. What is your capital?—A. Originally we had Rs1,00,000 and subsequently it was raised to Rs2,50,000, but the whole amount of this has not been subscribed. Rs10,000 or Rs15,000 was subscribed.

Q. It has ceased working?—A. No. It is working since 1909. It is a limited company.

Q. Rangpur produces particularly good tobacco?—A. Yes.

Q. You have a Government farm at Rangpur devoted to the cultivation and curing of tobacco?—A. There are three farms. We grow tobacco of various kinds and it was found to be in no way inferior to the best tobacco grown elsewhere.

Q. Did you grow any tobacco yourself?—A. Myself, i.e., our company. I also grew tobacco in our compound but not on a large scale.

Q. Were any Government farms working while your company was in operation?—A. Yes.

Q. Did you get assistance from them?—A. We purchased tobacco from them, if I remember, twice, but not more than that, as the price was too high for us.

Q. But did you get any help in experimental questions, such as in curing tobacco? Did you cure your tobacco or get it ready cured?—A. We cure the tobacco grown in our compound. We purchase tobacco generally from the cultivators.

Q. When was the Monghyr factory started?—A. I cannot give you the exact year.

Q. Did it start after you started?—A. About three or four years before we started on a very large scale.

Q. They purchased tobacco in your district?—A. Yes, so much so that practically the price of tobacco which was about Rs 3 or Rs 3-8-0 before went up to Rs 8 or Rs 9, because they began purchasing on a large scale.

Q. You make several brands of cigarettes?—A. Yes.

Q. The Monghyr factory sell these cheaper?—A. They sometimes sell cheaper and sometimes not. But they have got this superiority over us that practically all the big sellers are under their employ, because they pay a large commission, and the whole of the market practically is their monopoly.

Q. You do not pay even the same rate of commission?—A. No.

Q. Did you have any agent in Rangpur town?—Q. Yes.

Q. Outside the district, in Bogra?—A. Not only in Bogra but in other districts. We tried to open one at Cooch Behar and other districts but the result was not successful.

Q. Did you bring tobacco by cart or by railway?—A. So far as the tobacco bought in the district was concerned, we brought it in carts, but the tobacco we bought in Calcutta had to be taken by railway.

Q. What did your expert staff consist of?—A. We had at first a Parsee gentleman. Then we had a Bengali gentleman, and then we had an Eurasian and then an European gentleman. But they all proved to be unsatisfactory.

Q. Had these men any training or were they business managers?—A. The Parsee gentleman had training in his own factory at Bombay, in the cigarette factory. The others, of course, had training in the different factories here in India, i.e., in cigarette factories.

Q. You use machinery?—A. Yes.

Q. Where did you get it from?—A. We purchased some of our machinery from a Bombay factory and some from Germany through an English agency. The cigarette machines are all German machines.

Q. You bought second-hand?—A. Two were bought second-hand and one we bought direct.

Q. What local banking facilities are there in Rangpur?—A. There are three banks in Rangpur, but two of them did not give us any help. We started a new bank that gave us some help. It advanced money and issued cheques and so forth, but later it declined to give any financial assistance.

Q. It gave you money for working capital?—A. Also for purchasing machinery. For the third cigarette machine we had to purchase, we borrowed.

Q. What security did you give?—A. The whole concern,—the land, buildings and machinery. The whole block.

Q. You say you were troubled by unsuitable railway rates. Can you remember any particular instances?—A. I remember more than one instance in which owing to these difficulties we had lost the whole of the consignments. I remember two or three instances in which consignments of cigarettes sent to Calcutta took over a month to reach Calcutta and the result was that the whole of the consignment was spoiled.

Q. You did not pack them in tin-lined boxes?—A. No. It ought not to have taken more than five or six days.

Q. At the Monghyr factory they are packed in tin-lined boxes?—A. Yes.

Q. What did you want the Forest Department to do for you by way of finding wood for boxes?—A. We have machinery for the manufacture of stick tobacco. But for packing these tobaccos we require caddy boxes but we could not get any wood here.

Q. Did they give you any information at all, or did the information they gave prove unsuitable?—A. We tried our very best to get information from the Forest Department at Darjeeling. They gave some wood but it did not prove successful. Then we applied to the Director of Land Records and he introduced us to some officer in Dehra Dun and he simply wrote a letter and did nothing else. For want of good wood our machinery is lying idle.

Q. You suggest the appointment of trade representatives abroad for the popularisation of Indian manufactured tobacco?—A. Both manufactured and unmanufactured.

Q. Do you think it will be desirable to stimulate the export of unmanufactured tobacco?—A. Yes.

Q. You think that even if the full quantity is exported there will be plenty for Indian manufactures?—A. Yes.

Q. You think there will be a market abroad for the better grades of Indian grown tobacco and Indian manufactures?—A. It is practically in the hands of a few purchasers who can dictate their own terms.

Q. And the ryot therefore does not get a good price?—A. Yes.

Hon'ble Pandit M. M. Malaviya.—Q. When did you start this company?—A. It was registered in 1908 and the work practically started in May 1909.

Q. And when did it begin to pay?—A. It paid a small dividend only once. It is still working, but not at a profit. We are working still at a loss.

Q. Can you tell us the reason why it has not paid? Have you suffered by competition with anybody?—A. Suffered by competition. The capital was short and we did not get a good expert.

Q. What competition did you suffer from?—A. Competition with rival manufacturers. In Calcutta, we had the East India Cigarette Factory and at Monghyr we had the British Indian Tobacco Company which is now called the Imperial Tobacco Company.

Q. Is that not an American concern?—A. That was originally an American concern, but it was purchased by a British concern, and it is now also a British concern.

Q. Among the difficulties in raising capital, you mention an "Apprehension on the part of some zemindars and Government servants of incurring the displeasure of Government by subscribing to the capital of the company." Will you explain what you mean?—A. At the time when we started our factory there was the Swadeshi agitation and our difficulty was that some people were afraid to subscribe to the capital.

Q. That was only a temporary phase at the time?—A. My answer is limited to that.

Q. Afterwards things changed in 1908?—A. What would be the position now I cannot say.

Q. You say that you tried the local banks and Calcutta banks and they declined to finance you. Can you disclose the names of the banks?—A. The Bengal National Bank and the Hindustan Co-operative Bank.

Q. Then you started a new bank of your own?—A. Yes.

Q. You think that there should be an industrial bank which should finance industries?—A. Not one, but if possible more than one.

Q. One at least in every province?—A. One in each province with branches in different centres.

Q. You say, "I do not think any college in India has such modern scientific and chemical laboratories as will enable it to carry on the research investigations necessary for the solution of industrial problems?"—A. Yes.

Q. You think there should be a well-equipped college for this province?—A. At present we cannot get any assistance whatever, no scientific help. They ought to be not only better equipped but they should be designed for this very purpose.

Q. You mean better equipped to deal with industrial problems?—A. Yes.

Q. You say that you want a Research Institute for India, a Central Research Institute?—A. At present.

Q. And you also say that you would recommend the formation of new imperial scientific and technical departments?—A. Yes.

Q. Do you not think that a Central Research Institute would be sufficient for your purpose? You want the scientific and technical department to be independent of the research institute?—A. It may be closely connected. What we want is this, that there should be a research institute for the purpose of solution of industrial problems and unless there is a department of Government I do not think the matter can be satisfactorily done.

Q. You want this department to be separate and in addition to the research institute?—A. Yes.

Mr. C. E. Low.—Q. I thought you said that your company had ceased working.—A. No. It is still working, but not at a profit.

Q. Does the Monghyr factory make only cigarettes or does it make tobacco?—A. They make cigarettes, they make mixture and they make plug tobacco too.

Hon'ble Sir F. H. Stewart.—Q. You think that the difficulties you met with may be removed by direct Government help. Even Government help could not solve the difficulty relating to want of confidence in the business capacities of the promoters?—A. To a considerable extent if Government help is guaranteed we can get competent business men.

Q. You want Government to do everything then?—A. No. To help us in procuring experts, raising capital, etc. For instance we did our very best to get better experts but we could not.

Q. If Government helps you would it become a paying proposition though it was not found to be a sound business proposition to start with?—A. When Government help is assured, we would be able to get better experts, better people to manage, and sufficient capital.

Q. The new bank which you started to finance your company is it still working?—A. Yes.

Q. Is it successful?—A. Yes.

Q. But it did not think highly enough of the prospects of the Tobacco Company to go on financing it?—A. It cannot go on financing indefinitely a concern which has not proved successful.

Q. Is it a local bank?—A. Yes. It is situated in Rangpur.

Q. What is the bulk of its business?—A. Its registered capital is Rs. 2½ lakhs and it has got deposits. It advances money to different people on mortgages of lands and on hand notes and securities of that description.

Q. And it is working at a profit?—A. Yes.

Q. The capital of your Tobacco Company was increased from 1 to 2½ lakhs?—A. Yes. Only about Rs. 10,000 or Rs. 15,000 out of the increased capital was paid up. It was originally registered with a capital of 1 lakh. It was subscribed fully. Then it was found to be insufficient and the capital was raised to 2½ lakhs.

Q. And of that you managed to collect only Rs. 10,000 to Rs. 15,000?—A. Yes.

Q. That was the chief cause of your failure, that you could not get money?—A. Not only that. The chief cause was the shortness of money as well as competition. The East India Cigarette Company began to undersell and in some places the British Indian Tobacco company also began to undersell us.

Q. Is the East India Cigarette Company an Indian concern?—A. That may be called an Indian concern. Its largest shareholder is a Turkish gentleman. He had his factory at Hong Kong. He removed his business here to Bengal and made it a joint stock company and he of course took the largest share.

Q. Did they have a factory in your district?—A. No. They had a selling agency in Rangpur, who undersold us.

Q. They could undersell you with cigarettes manufactured in Hong Kong?—A. They now manufacture cigarettes here in Calcutta. The whole concern was transferred to Calcutta.

Q. Then you say you had to train up apprentices, machine men and labourers. You had no skilled labourers? You had to train these men?—A. When we originally started the company we brought some work people and machine men from Bombay and with their assistance we trained the local people here.

Q. You say you once managed to work at a profit. Was it for a year or half a year?—A. One year.

Q. At what stage was that? Fairly early?—A. During the third year from the year of registration of the company.

Q. And it was after that you began to feel the stress of competition?—A. Yes.

Q. At that time you thought you had got over your initial difficulties and saw prospects of success?—A. Yes, but then this competition became keener.

Q. And to meet the stress of competition you had to try to expand your business?—A. Yes. We purchased a new machine at a cost of Rs. 13,000. That was, of course, a German machine. That too did not help us.

Hon'ble Sir Fazulbhoj Currimbhoy.—Q. Were you the chief promoter of this Company?—A. Yes. May be said so.

Q. You started it during the swadeshi movement?—A. Yes.

Q. And how did you think of tobacco business? Had you had any experience before?—A. I had been dealing in tobacco for some time before this.

Q. In what way?—A. Purchasing tobacco and curing tobacco for the manufacture of cigars and so forth, and at our instance the Agricultural Association was started and at our instance the Government acquired lands and we paid money, and at our instance the Government acquired lands for the demonstration farm. There are experiments made there in the cultivation of tobacco.

Q. Did you calculate on American competition?—A. Yes, but we now see our calculations are incorrect.

Q. They can stand to make a loss while you cannot?—A. Yes.

Q. At what price do you sell 100 cigarettes?—A. We sell by thousands. The machine made cigarettes are sold by thousands. During the year we worked at a profit, we sold the lowest grade cigarettes at Rs. 2-6-0 to Rs. 2-8-0 per 1,000, but in consequence of competition we had to reduce it to Rs. 1-4-0.

Q. And American cigarettes are sold here?—A. They have got various brands. They sell the same quality of cigarette that we sell at Rs. 1-4-0, at Rs. 2-10-0.

Q. They have got a still lower quality to compete with you?—A. I know they have got cigarettes which they sell at annas fifteen. These cigarettes have to be sold through agencies. They are big sellers in Calcutta and other centres. All these people are under contract with the American Tobacco Company. They pay a large commission and unless you approach these people you cannot go on selling in retail. We could not sell through these people as we could not afford to pay that commission. When we started the factory we began purchasing tobacco at Rs. 3-8-0, but the British American Tobacco Company began making large purchases and the result was that the price of tobacco leaves went from Rs. 3 to Rs. 9.

Q. You say you bought some machinery from Bombay?—A. Yes. From Messrs. Warden & Co.

Q. They had their own factory?—A. Yes.

Q. And they rejected that machinery because it was not paying to them, and you took it over?—A. Whether they were losing I cannot exactly say.

Q. This machinery they rejected?—A. I do not know. We had it inspected by Mr. P. N. Bose, our director.

Q. Was he an expert in tobacco machinery?—A. We had our own engineer and he said it was all right. Then we purchased new machinery too. We purchased stock and other things also.

Q. Then you say, "Government experts or Director of Industries appointed by the Government, or his assistants, or some local executive officers of Government should be appointed extraordinary directors with defined powers of supervision, direction and advice." Do you want experts or non-experts as directors?—A. I want experts.

Q. Do you think that a small company can afford to have an expert as director?—A. In case it is not possible, a local officer may be appointed.

Q. About your bank, you say you started the bank to finance your own concern. Do you owe the bank any money?—A. The company owes to the bank about Rs. 80,000. It is still unpaid.

Q. And therefore they cannot advance more?—A. No. They have given the amount on machinery and everything, on the mortgage of the whole concern.

Q. What are they now doing? They lend money like sowcars?—A. They advance money not only to this concern but to other people also.

Q. Financing trade or lending money to sowcars?—A. They lend money to zemindars, traders, merchants.

Q. Just like sowcars?—A. Yes.

Q. You say that trade representatives should be respectable firms?—A. Registered firms.

Q. Where registered?—A. May be registered anywhere, in England or India.

Q. Suppose there is a firm in Italy. In what way can they be of assistance to you to promote Indian trade?—A. You know what is called Bengal ginger, which is nothing but ginger grown in Rangpur. Nowhere else in Bengal is ginger grown. The Madras ginger is better. Through the Department of Agriculture we grew that quality of ginger in Rangpur. It grew well. After examination of some papers I found that Bengal ginger was selling at a lower price than Sumatra and other gingers. I sent two consignments of ginger to England direct for sale, and the result was that I lost the whole money, and unless you get a respectable firm, registered or unregistered—registered would be better you cannot sell your agricultural products directly in foreign countries.

Q. We have got British Embassies and consuls at every important place, and don't you think it would be better if you got an Indian representative attached to the Consulate?—A. That will do. I doubt whether Government will do it.

Q. They have got commercial attachés too?—A. I doubt whether they will undertake this sort of duty.

Q. Are you training up any apprentices in your factory?—A. At present, not.

Q. You state that the Board of Industries should have executive powers over budgetted funds?—A. My idea is that Government should give financial help to industrial ventures and for the purpose of ascertaining whether a particular venture will be successful or not, to give sound advice, I propose that method.

Q. There should be some fund specially set apart for helping industries every year?—A. Yes.

Q. Have you any railway freight difficulties relating to tobacco?—A. Ordinarily railway freight is very high.

Q. Mr. A. Chatterton.—Is the Rangpur Tobacco Company a public registered company?—A. Yes.

Q. Have you published balance sheets from time to time?—A. We have been publishing balance sheets every year. I shall send to the Commission a copy of the balance sheet of every year.

Q. You have three cigarette machines?—A. Yes.

Q. What else have you got?—A. We have got tobacco cutting machines, snuff machines, plug tobacco making machines, tin cutting machine, etc.

Q. Have you any machinery for making cases, for packing?—A. No. We pack by hand.

Q. Are the packages you make by hand as nice as the machine made ones of the Monghyr factory?—A. In packing there is very little difference.

Q. You mean that your packing is just as good as the other?—A. Yes.

Q. You started this company without any experience of the business, with a second-hand machine?—A. I saw cigarette making.

B. M. Das.

Q. Would you mind telling us what your annual turnover of cigarettes is?—A. So far as our machinery is concerned we can manufacture about four lakhs a day, but do not manufacture so much, because we cannot find buyers of the whole daily outturn. That was our initial difficulty. The whole trade is practically in the monopoly of the big concern named before.

Q. You say you are working this factory at a loss?—A. Yes.

Q. How much loss?—A. It is not possible to give it. We have reduced our establishments and the loss for the last two years has been not more than Rs. 3,000 a year. On the whole we have lost about Rs. 75,000 to Rs. 80,000.

Q. Practically the whole of your capital is gone?—A. Yes.

Q. Have you mortgages on your block?—A. It is mortgaged to the bank.

WITNESS No. 88.

MR. B. M. DAS, *Manager, National Tannery, Calcutta.*

WRITTEN EVIDENCE.

ital.

Money can hardly be called scarce in Bengal. There is a tendency to invest it in land, middleman's trade and in money-lending business. But when wanted for manufacturing industries capital is more or less shy, because investments in many of them are not yet considered safe. Industrial enterprise and investing spirit are however not altogether lacking, as is evidenced by the fact that the industries which have succeeded in convincing the people of their profits have not failed to attract capital.

The Bengal Chemical and Pharmaceutical Works Limited of Calcutta, the tea industries of Jalpaiguri and Darjeeling, the collieries of Jheria and Ranigunj may be cited as instances to this point.

In some of the most profitable industries there seems to be already over-capitalisation. Notable amongst them are the oil mills in Calcutta. They have in fact to work short time.

The first thing therefore for a proposed industry to get capital is to inspire faith and to carry the conviction of its economic soundness to the public. Once the ice is broken the wealth of the country will easily flow in industrial channels.

One way to do it is to start an industry, whenever possible, on a small scale and by its work convince the public of its soundness and possibilities. Working facts and figures showing the profits actually made are far more convincing than mere prospectuses.

Such small industrial concerns are to be started either by private enterprise and capital or in case that be not forthcoming should be pioneered by the Government.

Happily in Calcutta a few industries have already been pioneered in this way by private enterprise.

The Bengal Chemical and Pharmaceutical Works which is now a limited liability company was started on a very modest scale, worked patiently for quite a long time and when the promoters were satisfied as to its economic soundness it was made into a limited company and shares were sold to the public quite easily.

The Calcutta Pottery Works which is still a private concern had a very modest beginning and by its patient work of a decade has convinced many of its possibilities.

The National Tannery belonging to the Hon'ble Dr. Nilratan Sircar is another instance to the point. It was started at first on a very small scale. It has worked patiently for 10 years extending its works and expanding the business every year. The accumulated experience and mass of working figures would leave no doubt even in the most pessimistic minds that there is money in chrome tanning.

These small concerns have indeed done immense good to the country—so far as pioneering goes. Their growth, however, is hampered by the way in which they are financed. The private capital with which they were started must of course be limited and is quite unable to cope with growing business. Sometimes it has been the case that a factory has been built and machinery installed but has not been able to work for a long time for want of working capital. More often for want of liquid money some concerns cannot make their purchases at the cheapest market or in the proper season.

These handicaps could be removed if the Government would come forward with money facilities in some shape or other. In my opinion giving proper banking facilities by starting industrial banks would solve the problem in the most satisfactory way.

Supply by Government of machinery and plant on hire purchase system would also help the growth of many struggling concerns.

Some proprietors may be willing to convert their proprietary concerns into limited companies. In such cases the Government may help a great deal in inspiring confidence in the minds of the investing public either by subscribing a part of the capital or by guaranteeing a dividend for a period. It is a well-known fact that the people of this country have got

more faith in the Government than in private individuals or companies and would willingly invest in concerns in which Government is interested.

In companies in which the Government holds shares or guarantees dividends it should have one or more representatives in the directorate. The number of Government directors should be in proportion to the Government investment. Accounts should also be checked periodically by Government auditors.

As soon as the concern will have sufficient capital and be on a dividend-paying footing and the Government is convinced that the concern no longer needs its association, the Government should withdraw by selling its shares to the public and should apply its funds to help or pioneer some other industries that might be in need of them.

There are some industries which cannot be started on a small scale and are hence beyond the capacity of private individuals. These industries should be pioneered by Government. The following are a few instances of the type.

An attempt should be made to distil the tar and produce some of the more important intermediate products at least instead of running the entire quantity to waste. The coal tar industry.

Carbonate of soda and potash, caustic soda and potash are most important chemicals for many industries, such as soap, paper pulp, etc. They are also required for the manufacture of other chemicals which find use in industries. For instance chrome tanners require bichromate of potash. We have got chromite in India but to make bichromate from it we want cheap potash. The alkali industry.

The Forest Department of the Government may profitably pioneer the manufacture of tannin extracts from the known tanning materials.

Instances are not wanting in India to show how Government pioneering has produced excellent results.

The Indian tea industry owes its origin, popularity, and prosperity to Government help and pioneering. The Government of India had to undergo a lot of expenditure (according to Watt's estimate about £72,000) to introduce tea plantation in India and when the condition of the tea industry was prosperous and did not require any Government help, it was handed over to private enterprise.

The development of the leather and leather goods making industry of Cawnpur and Agra is due mainly to Government encouragement.

The fruitful results of Mr. Chatterton's pioneering of chrome tanning under the auspices of the Government of Madras are to be seen in the chrome tanneries started in Bangalore, Calcutta, Cuttack, Berhampore, Allahabad, and Rewah. Besides these recognised tanneries working on factory scale there are many private individuals who are tanning sheep and goat skins by chrome process on a small scale and are making a living out of it. Indeed these individuals would be benefited a great deal if they receive help from the Government to get machinery. These are earnest men and should be encouraged on all possible ways.

Next to capital expert knowledge is the most essential thing for an industry.

Technical aid.

A step in the right direction was taken when the Association for the Advancement and Cultivation of Science and Industry in Bengal undertook to send abroad a number of young men for industrial training. The Government of India and the University of Calcutta also award scholarships for the industrial training in foreign countries.

The number as well as the period of the Government technical scholarships should however be increased. Three years, for which at present the scholarships are made tenable, are not sufficient for thorough study of an industry and should hence be extended to at least five years.

The Home Government as well as the British Embassies in other countries should try to secure for the candidates facilities to get practical experience in factories.

Payment of premium sometimes facilitates a candidate's admission into a factory as apprentice. In such cases the Government should pay the premium. I had to pay 500 francs for 3 months' apprenticeship in a tannery in Italy. The University of Calcutta very kindly granted me the sum.

In selecting candidates for training as experts of a certain industry stress should be laid not only on their scientific attainments but also on their experience of the industry as it exists in the country. For industries that are to be started *de novo* this is not possible, but for existing industries instead of sending brand new men both the Government and private Associations should make it a point to send the managers or experts of existing concerns who have already got some working experience in order that they may add to their knowledge and solve various difficulties which they have met with in their practical work.

In the past selection of candidates for these scholarships was not very happy. Mediocre men having no special industrial aptitude returning from foreign countries with indifferent technical training caused some disappointment on a few occasions.

If these experts are the direct cause of some failures the authorities who were responsible for the selection are also to be blamed. Failures have also been due sometimes to want of forethought on the part of capitalists who often started industries under the impulse of

Swadeshi enthusiasm and did not adequately consider the various factors essential for the success of an industrial undertaking.

Technological institutions.

Training of experts by sending men to foreign countries is very expensive. Besides everybody can't have the good fortune of securing an industrial scholarship and there may be many who have nevertheless an aptitude, inclination and necessary qualification for industrial training, but for want of proper facilities are drifted to other walks of life.

For this reason technological institutions for training of experts locally should be started in different provinces just as there are Medical, Engineering and Agricultural Colleges in the various important provinces of India.

In these institutes different technological subjects should be taught and in selecting subjects for a provincial technological institute special stress should be laid upon the subjects for which the province is specially suited.

In this matter one may follow the lines on which the British and Continental technological institutes were started.

Thus Leeds and London being the chief tanning centres special stress has been laid upon tanning at those places and the leather industries department of the Leeds University and the Leather Sellers' Technical College in London were opened.

On the same principle were started the "Gerberei Technische Hochschule" in Freiburg, Germany, the Gerberei Technische Untersuchungsanstalt in Vienna, and the tanning schools in Italy and France.

In dyeing, engineering and mining we find the same principle applied in every country.

A technological institute ought to be started in Calcutta in which among other subjects special importance should be attached to the teaching of leather manufacture, for hides and skins are one of the most important raw materials of Bengal.

The constitution of the teaching staff of a department of a technological institute may be best explained by taking a concrete example. In the leather industries department, for instance, there should be a chair of technology of leather manufacture. The incumbent of this post should be a man of either European or American reputation. I mean men of the stamp of Professor Procter of the Leeds University, or Dr. Gordon Parker of London Leather Sellers' College, or Professor Meunier of France, Professors Schorlemmer and Becker of Germany or Professor Eitener of Vienna. He may be called the Director of the department and should be assisted by—

- (1) One chemist and two demonstrators to help him in the chemical investigations bearing on leather industry. The chemist should be a Bengali with European qualifications. The demonstrators should be appointed from the advanced students of the department.
- (2) Two practical tanners, one of whom should be an expert in heavy leather manufacture and the other in light and chrome leather making. These experts should be thoroughly experienced men and be preferably liberal-minded Europeans or Americans.

courses of instruction.

There should be three courses of instruction,—

- (1) Advanced.
- (2) Intermediate.
- (3) Elementary.

Advanced course.

To this only science graduates, B.Sc.s and M.Sc.s will be admitted. They will receive such instructions in the higher technology of leather manufacture as will enable them to carry on scientific investigations connected with the industry. Some of the Government industrial scholars should be selected from these advanced students and sent abroad to supplement their knowledge and get foreign experience. But before leaving this country they should get themselves apprenticed for some time in a local tannery and study the existing conditions.

Intermediate course.

This course is meant for foremen and supervisors. To this will be admitted young matriculates and also others who having received some school education had joined a tannery and have had practical experience in leather manufacture. They will first be taught elementary chemistry, both theoretical and analytical, and afterwards the applied chemistry of leather manufacture. Equipped with this training they will be in a better position to control the different processes involved in the manufacture of leather.

Elementary course.

This is meant chiefly for the skilled workmen and will consist in practical demonstration of the various mechanical and hand operations required in leather manufacture.

This class be better held at night so that workmen may attend after factory hours. The demonstrations will have to be explained in the provincial vernacular.

Demonstration factory.

A demonstration factory, that is a tannery in miniature equipped with all up-to-date machinery should be attached to the department. I should think that the installation of machinery won't be a costly affair, because the machine manufacturers would in many cases be too willing to send one or more of their machines to the department for exhibition and advertisement. This in fact has been the case in the leather industries department at Leeds.

A small plant for making tannin extracts and a glue boiler should also find place in the demonstration factory.

In the demonstration factory practical tanning experiments should be carried out to manufacture new kinds of leather not yet produced in the country, for instance enamelled horse hides for motor car cushions, chrome patent leather, leathers for pickers and picking bands for the cotton and the jute mills. When the processes for manufacturing these leathers are successful, they should be made known to the public and after showing their commercial possibilities tanners should be induced to undertake these new lines of manufacture. Practical investigation.

The tanning experts should pay periodical visits to the local tanneries, see the processes used and suggest improvements, and by practical demonstrations convince the country tanners of the advantages of improved methods.

The small country tanners may not come to the leather industries department, but the experts, working as it were, like industrial missionaries should go to the tanners with a view to ameliorate the condition of the tanning industry. It may be a case of mountains going to Mahomet but it should be done to produce results.

Knowledge is to be conveyed and thrust upon the Indian artisan and craftsman so that he may wake up, wonder and finally adopt improved methods.

If organised concerns, tanneries or otherwise, want the services of Government experts or chemists, they may have them on the payment of some fees depending on the duration and importance of the work they will be asked to do. If adequate fees are paid by private concerns the results of the investigations should not be made public.

There should be two laboratories attached to the department, (1) General Laboratory and Laboratories. (2) Research Laboratory.

General Laboratory.—In this students will work.

Research Laboratory.—In this analyses and tests for the trade will be done and higher scientific problems bearing on the industry should be investigated by research scholars and chemists under the guidance of the director. Subjects, such for instance a thorough investigation of the tanning materials available in Bengal with respect to their tannin contents, tanning properties, commercial possibility of making extracts out of them, etc., may be profitably undertaken.

Various other scientific problems connected with leather industry which have not yet been solved by the leather trades chemists may be investigated.

In the technological institute there should be a good library having the standard books of reference on pure and applied sciences. Trade journals and scientific periodicals in English, French and German should be subscribed. Technological library.

Attached to the department there should be a museum containing samples of raw materials and the best samples of finished articles as made from them in other countries. Side by side there should be finished articles as are made locally. This will show the progress of the industry and indicate how far below the standard the local products still are. Museum.

Organisation of the Government Department of Technology.—The different departmental heads or directors will be under the Director of Industries for that province and they will be members of the Provincial Board of Directors of which the Director of Industries will be the President. The Director of Industries will be a sound man of business with general knowledge of technology.

The Provincial Boards of Industries will be controlled by the Member of Commerce and Industry of the Government of India.

Foremen are the products of practical experience and hence must be trained in the factory by the apprenticeship system. They can never anticipate an industry but must grow with it. They should improve their knowledge and cultivate scientific habits by attending the elementary and intermediate courses of the technological institute. Training of foremen.

In Bengal the great body of middle class youths who have had some school education should be attracted to these jobs. It is true that there was, and to a great extent there still is, the sentimental objection on the part of sons of Bhadrals to be called foremen or mistris. But those snobbish sentiments are fast dying out and we find youths of Bhadrals class serving as chauffeurs of motor cars in Calcutta.

In our tannery we have got Baidya and Brahmin youths as clickers in the boot and shoe-making department and have also received applications for apprenticeship in our tannery from several boys belonging to the middle class.

At the cabinet manufacturers' at Bowbazar the youths who do the sand-papering and varnishing of the furniture belong mostly to Bhadrals class.

In Calcutta Pottery Works my friend Mr. Deb has trained several youths of the Bhadrals class to be potters.

These are the signs of the times and clear indications that the Bengali middle class are realising the dignity of labour. From these it can be expected that should industrial growth in Bengal get an impetus at the hands and under the fostering care of the Government neither the Bengali capitalist nor the Bengali middle class would be failing to come forward.

urers,

For tanning industry there is absolutely no dearth of labour in Calcutta. According to the Census of 1911 in Bengal there are 136,553 Chamars (leather workers) of whom 86,504 are males and 455,448 Mochis—leather-workers and boot and shoe-makers—of whom 244,012 are males. Besides these, Chamars and Mochis come to Calcutta from Bihar and Orissa, North-Western Provinces and the Punjab.

In Calcutta alone there are 33,808 Chamars (25,454 males) and 12,703 Mochis (9,343 males).

The Chamars are hard-working, regular and intelligent. They are capable of easily adapting themselves to new methods of work and also understand new processes.

In our chrome tannery the Chamars who, previous to their coming to us, were only accustomed to bark tanning and had no idea of machine work quickly adapted themselves to the processes involved in chrome tanning. Some of them after a few months' practice learnt to work various machines with skill and intelligence and in fact for Rs. 15 to Rs. 20 per month. I am getting almost the same class of machine work from the Chamars for which in England and Germany 20 to 25 shillings are paid per week. If they are shown and instructed in improved methods of work by leather experts in the manner I have sketched earlier in this statement there is little doubt that they will be as skilled and as efficient hands as are found in Europe and America.

It has been found that by far better class of work is got from those who are literate. This suggests that more efficiency in labour would be got by the spread of primary education among the labouring classes.

Many of these Chamars are skilled bark tanners and taxidermists and the leathers that some of them turn out and the furs that some of them dress will, I am sure, excite admiration from the severest critic.

So far labour in the leather industries is concerned the ground appears to be quite fertile. It requires now careful sowing of seed to reap a rich harvest.

Leather industries have got immense prospects in Bengal as I have attempted to show in my note already submitted to the Commission.

The development of Indian leather industries will not only be of benefit to India but will increase the Imperial resources and is urgently needed to make the British Empire self-contained so far as leather is concerned. Although tanner's trade is not so spectacular as ammunition-making, leather is as much indispensable for the Army as powder and shell. In absence of sufficient hides and tanning materials in the United Kingdom it is idle to expect she herself would be able to meet all her requirements for leather. She must therefore get her supply from elsewhere and her first concern should be to get as much of it as possible from within the Empire, that is, from her dependencies and Colonies.

During the present war Madras and Bombay have done their bit to minister to the Imperial needs for leather but it is America who has supplied the bulk both of leathers and tanning materials, *viz.*, tannin extracts, and has really saved the situation.

If tanning industries were properly developed in India as her vast resources in hides and tans would justify, Indian leathers would have been valuable assets to the Empire, and England would not have required in that case to import American leathers and tans at inflated price at this time of economic stress.

ORAL EVIDENCE, 29TH NOVEMBER, 1916.

Mr. C. E. Low.—Q. You are manager of the National Tannery, Calcutta?—A. Yes; it was started about 1905, and is a proprietary concern.

Q. Is there any objection to mentioning the names of the partners?—A. There are no partners. It belongs to Dr. Nilratan Sircar.

Q. What capital is he employing in it?—A. I could not tell you.

Q. Is it succeeding at present?—A. Oh, yes.

Q. Who are purchasing your leather?—A. The leathers are purchased by local middle men, and we also export leathers to Agra, Bombay and Basrah.

Q. Do the Cawnpore leather factories, such as Cooper, Allen & Co., use your leather?—A. No; they don't.

Q. Do they use any chrome leather?—A. I heard that they used to before the war, but since the outbreak of war, they are busy with the making of ammunition boots, so they don't want chrome leather.

Q. Did you start on the chrome leather manufacture at once in 1905?—A. Yes, but with a side line in bark tanning, both were done, chrome as well as bark.

Q. Where do you purchase your hides from?—A. The bulk of them locally, and part from outside.

Q. Do you find any competition from big hide exporting firms; do they compete with you at all?—A. Oh, yes; we find enormous competition; as a matter of fact, prices of hides which we purchase have gone up 20 per cent. and the matter is getting worse and worse.

Q. Before the war did you find that these large hide-exporting firms put the prices up?—
A. Of course the hide market used always to fluctuate in accordance with the shipments even before the war.

Q. What technical staff do you employ?—A. I am the expert there : I manage.

Q. Where was your training received?—A. I was trained at first in the University of Leeds, in the Leather Industries Department, and afterwards received some practical training in Germany and Italy.

Q. Did you go at your own expense or did you have a scholarship?—A. I secured a scholarship from the University of Calcutta.

Q. What other superior staff do you employ?—A. On the technical side I have got two Assistants. They have been trained in our tannery. They have now a good practical training in chrome leather manufacture. One is getting Rs. 100 and the other Rs. 75 per month.

Q. Had they any educational qualifications before they came?—A. They are failed Matrics.

Q. Are they Bhadrals?—A. Yes, they are relatives of Dr. Sircar.

Q. Who are your workmen?—A. They are of the Chamar class. In the tanning department they all belong to the Chamar class ; in the boot and shoe making, we generally get Mahomedans, and for one particular high class of shoes, we get Mochies, and for some sort of machine work and cutting uppers we have got also Bhadrals boys.

Q. How much do they make?—A. They have been taken very recently as apprentices ; one is getting Rs. 22 and the other Rs. 14. The one getting Rs. 22 has learnt the work very well.

Q. What is their intention ; do they intend to stay on with you and earn as much as they can, or start on their own account?—A. I don't think their intention is to stay with us, unless we hold out sufficient prospects.

Q. Did you have any difficulty about capital for purchasing raw materials or holding stocks?—A. Yes.

Q. Have you tried to borrow from any banks or other financial institutions?—A. As a matter of fact, I have not got any personal knowledge about it, because the proprietor does that himself, but as far as I know, he experienced difficulty in getting money to hold stocks.

Q. Speaking of the employment of Bhadrals in industrial concerns, have you seen Bhadrals, during the last three or four years, taking to industrial employment in Calcutta more than they used to formerly?—A. My personal experience is that if a man can get a chance of getting a job in a tannery or other business, he will come forward. There is no difficulty in getting a man of the Bhadrals class into a tannery.

Q. It all depends, I suppose, on the pay?—A. On the prospects that you can hold out to them. A man will be ready to come on less than he gets elsewhere if he sees prospects of improving his condition.

Q. What education would a man of that type have?—A. They are generally only Matrics, or have failed in the Matriculation Examination.

Q. Do you find that those men are less intelligent than others who have taken their degree?—A. Not all of them ; as a matter of fact I have got one assistant who is not a graduate, but he has got more commonsense than an average graduate, and he is of better help to me than an M. A. or M. Sc. would probably be.

Q. In your first para. you talk about the investment of money. Do many Indians invest money in jute mills?—A. I don't know ; I have no experience.

Q. Nor whether they invest money in light railways?—A. I think so ; my information is that they have invested money in light railways.

Q. For what reason?—A. Because they are profitable, and they find that the investment is safe.

Q. Is it to any extent due to the guarantee?—A. I think so.

Q. That is to say, what capital seeks in Bengal is not necessarily industries, or any other particular kind of investment, but it looks for a guarantee?—A. It looks for a guarantee as regards safety.

Q. They prefer a guarantee rather than speculation?—A. Not always ; there is always a degree of speculation among some monied men, but on the whole it looks as if people wanted safety in regard to their savings. I think I have given some examples where investments have come very readily.

Q. Do you think that the local tanning of hides in Calcutta or in the neighbourhood of Calcutta can be taken up on a large scale?—A. I am not speaking merely of chrome tanning, but of tanning generally.

Q. How far do you think these hides in India can be tanned at a profit?—A. They can be tanned and exported in a rough tanned condition to England or elsewhere where they may be finished according to requirements.

Q. Do you think that could be done at a profit, given the capital and expert skill?—A. Yes.

Hon'ble Pandit M. M. Malaviya.—Q. You think that if the Government would come forward to help to establish Industrial Banks, then the difficulties of these enterprises would be solved?—A. That is my honest conviction.

Q. But you think that it is essential that Government should be connected, in some form, with the bank, either by subscribing part of the capital, or by guaranteeing interest, or by laying down that there shall be a Government audit for the bank?—A. In some form or other Government should be interested in those banks, in order to inspire public confidence.

Q. From your remarks which follow, am I right in inferring that you think that what is needed above all cases is that there should be confidence inspired in private persons in investing their capital in business enterprise?—A. Yes, that is my idea.

Q. And you think that that can be done by Government showing an interest in these enterprises?—A. Yes, that is my idea.

Q. You suggest that the number as well as the period of Government technical scholarships should be increased. Do you know the number of Government scholarships at present?—A. I think it is only two.

Q. What number do you suggest, in view of the training in the various industries that has to be provided; what number would you suggest for Bengal, for instance?—A. At least six every year.

Q. Do you think that these six scholarships will be sufficient to meet the industrial demands of a growing province?—A. My idea is that six will be better than two.

Q. I ask you this because you say, "technological institutions for the training of experts locally should be started in different provinces", and you also say that the training of experts "by sending men to foreign countries is very expensive", you think that men should receive their preliminary training here, and as the result of that a few of them should be sent to foreign countries. You would provide however for the education abroad of a large number of young men?—A. Yes, but only the best of educated men should be sent out.

Q. You suggest that tanning experts should pay periodical visits to local tanneries; do you think these tanneries will welcome the visits of these experts?—A. In the beginning they may not, but it all depends on the way they are approached.

Q. If they hold demonstrations, for instance, demonstrations in improved methods, do you think they will attract them?—A. That may attract a portion of them, but not all, because the condition of tanneries in Calcutta is rather curious. The bulk of them belong to very illiterate classes of people, mostly Chamars and Mahomedans. Of course they don't know the value of improvements, so long as they can sell their goods they are all right. But my honest conviction is that the processes which they use require a bit of overhauling and that is to be done by these experts.

Q. You suggest that they should go about like industrial missionaries, holding demonstrations and asking these tanners to see the improved methods they employ?—A. Yes, I have suggested that in my statement as well.

Hon'ble Sir F. H. Stewart.—Q. Is your factory in Calcutta still?—A. Yes, in the suburbs.

Q. How long have you been in this industry; since 1905?—A. No, I have been in this particular tannery about three years.

Q. Were you in another tannery in Calcutta before that?—A. No, just after I returned from Europe I joined this tannery.

Q. How long did your education take?—A. In Leeds I was for two years. Then I was apprenticed to an Italian Tannery near Milan for about one year. Then I went to Germany, and was employed there in a dye factory as a leather expert and Chemist.

Q. You were earning money in Germany?—A. Yes.

Q. How long were you there?—A. About 1½ years.

Q. Your experience is rather unique; not many of your countrymen have had a training like that?—A. Not many had a chance. I first met with difficulties in getting into a tannery.

Q. Did you have any special difficulty in getting apprenticed to this tannery in Germany?—A. Not in Germany, it was in Italy. When I finished my course I tried to get into an English tannery. Well, my professors, the Professor of Chemistry, as well as Mr. Procter of Leeds University, tried their best to get an apprenticeship for me either in Yorkshire or elsewhere, but no one would take me. I approached the India Office as well and went to Mr. Theodore Morrison and also to Dr. P. K. Ray. The latter could not help me; no one would in England, so I went to Germany, and in Germany I had a letter of introduction from Professor Procter to a German colour works. They took me as an apprentice for some time in the Leather Dyeing Department. There I made friends with a German leather expert. He had a brother who was manager of an Italian tannery. He gave me a letter to his brother, and I got into the tannery at Milan. Once I was there I made a big circle of friends.

Q. Were you one of the State Technical scholars?—A. No, it was not a Government scholarship; mine was an endowment scholarship belonging to the Calcutta University.

Q. You say you buy your hides locally; do you do that part of the work too?—A. I go to the slaughter houses occasionally and make purchases.

Q. You are an expert in the purchase of hides as well as in the manufacture of leather?—A. I cannot say I am an expert, but I have to make the best of the case. The practice in Calcutta is to buy hides from live stock while the animals are living. They are taken to the slaughter houses; there I see the animals and pick and choose and make my purchases. It is, of course, more difficult to select from dried hides.

Q. Have you had any experience of the foreign export trade; have you ever entered that at all?—A. Yes so far as statistics go, but I have never been engaged in it either in hide or leather.

Q. Are there any special difficulties that you have met with in your work at these tanneries, which you can tell us about?—A. Do you mean technical or business difficulties?

Q. Business?—A. Business difficulties are that we have not always sufficient funds.

Q. That would be common to all industries very often; say technical difficulties then?—A. The technical difficulties are many that we have to solve. Of course, I have to solve them myself in my tannery. We cannot turn out exactly the stuff as is turned out elsewhere in England or America.

Q. You think that you have succeeded in solving them; your tannery is progressing satisfactorily and is a prosperous concern?—A. Yes, I have solved them to such an extent that my goods are marketable and are sold at good prices, but I cannot say that I have solved them to the extent that they are equal to the best makes in America or England. Our leathers are now sold almost before they are made, i.e., we get forward contracts.

Q. And you think that there is plenty of room for the expansion of this tanning trade?—A. Yes, there is very large room for the expansion of tanning of all sorts, but the difficulty in regard to chrome tanning is to get the right sort of material.

Q. But you think that it would be very necessary that someone who thoroughly understands it should be in charge of it? You have had a very varied practical training, of which others have not had an opportunity, but it would be a very dangerous thing to embark upon without practical experience or knowledge?—A. It would be dangerous, but practical experience can be got, if not in India, at home.

Hon'ble Sir Fazulbhoj Currimbhoy.—Q. You say you have got forward contracts, but before the war had you any forward contracts, or was there any difficulty in selling your products here?—A. In the early years there was difficulty for three or four years, because the outturn was of a very bad quality, and then too chrome leather was not much appreciated at that time. Afterwards when it was once made marketable, there was no difficulty in selling even before the war.

Q. Were you selling before the war at good profits?—A. It was a profitable concern before the war, only the tanning department, but not the boot-making department.

Q. You are making boots also?—A. Yes.

Q. Is the boot-making profitable now?—A. Yes.

Q. Have you got any experts in that line?—A. We have no experts. I have got to look to it.

Q. Have you got experience?—A. A little, not as much as of tanning.

Q. You think that you have a big scope for your tannery factory?—A. If we could enlarge it, we could make a bigger profit if we had the financial help.

Q. Do you want that a Technological College should be started in Calcutta?—A. Yes.

Q. Do you think it would be advisable to have the technical training of a primary grade to be given in the secondary schools too; the manual training and other things in the high schools?—A. Yes, if possible.

Q. Then they may be feeders for the Technological College?—A. Yes, that is a good idea.

Q. Or would you prefer matriculated boys to go to the Technological College?—A. Boys who have already got some technical education would be much better in the technological school.

Q. For research work you want a Central Technological College?—A. My plan is to have one Technological Institution over the different departments with research too. Advanced, Intermediate and Elementary, those three could be combined in one institution.

Q. Then with reference to Provincial Boards of Industries which you say "will be controlled by the Member of Commerce and Industry of the Government of India." You want this Department under the Member of Commerce?—A. Yes, that is one way of organising the department?

Hon'ble Sir R. N. Mookerjee.—Q. You are not acquainted with the financial part of this concern?—A. No, not very much.

Q. So that when you say that the industry is paying, you don't know what capital has already been expended, or whether it is paying on the present capital or on the capital expended

from the beginning?—*A.* I have got some rough idea about the money spent, which I am not prepared to lay before the Commission just now, because it may be that it is not the proprietor's idea about it. So far as the manufacturing accounts are concerned, I know that we are making profits.

Q. You are making profits at war time; taking the capital of the whole concern, from the beginning up to now, are you prepared to say that you are making profit; do you know the particulars about it?—*A.* Yes, I am prepared to say it is paying.

Q. Supposing for instance you expended from the beginning three lakhs, or five lakhs, are you making profit on the five lakhs at present?—*A.* No, because those five lakhs have been spent in very small instalments over ten years.

Q. You say it is paying because you take the capital for last year; you don't calculate from the beginning?—*A.* Taking the amount of profit we are making on the present capital, say for instance 20 per cent, if you calculate that on the whole capital expended we might be making, say, 5 per cent. Still we are making some profit.

Q. Are you certain you will make a profit when there are no war conditions?—*A.* With reference to this chrome tanning industry, the war has made very little difference because now we have increased the price of our output. The prices of raw materials have also gone high, so the margin of profit is almost the same.

Q. You are hopeful that even when prices come down to normal conditions you will make profit on the present capital?—*A.* Yes, on the present capital, only we shall have to make some extensions to better our situation.

Q. My question is whether this industry is a profitable concern, independent of the war conditions under which you are working?—*A.* Yes, it is profitable.

Q. You say you went to England with a scholarship from the Calcutta University, and you also say that "the past selection of candidates for these scholarships was not very happy." Do you mean only the Government selection or all of them?—*A.* I mean all of them.

Q. The students sent by the Indian Association, by the Government, and by the University are all included by you, and your experience is that the selection by all three of them was not a happy one?—*A.* Not always, because I know that the Government scholars who were sent ought not to have been sent.

Q. You say that "an attempt should be made to distil tar and produce some of the more important intermediate products at least, instead of running the entire quantity to waste." Are you aware that the coal tar industry is being already carried on in India?—*A.* I am not aware.

Q. It is being done very largely?—*A.* Not in regard to intermediate products.

Q. All bye-products from coal?—*A.* Coal tar is a bye-product from gas coal, but the distillation of coal tar for the manufacture of aniline colours.

Q. That is being done now?—*A.* They attempted to do it. Not only attempted, but they are selling and making profits.

Mr. C. B. Low.—Q. You say that "in selecting candidates for training as experts of a certain industry, stress should be laid not only on their scientific attainments but also on their experience of the industry as it exists in the country." Before you were selected for the scholarship by the Calcutta University, had you had any previous experience of the industry?—*A.* I had no experience of the tanning industry, but was connected with the chemical industry.

Q. I congratulate the Calcutta University on their choice in this case, but it was more or less a matter of chance from their point of view?—*A.* I also experienced many difficulties for the reason that I had no practical experience of tanning. Had I practical experience I should have been much better off.

Mr. A. Chatterton.—Q. What year did you go home?—*A.* 1909.

Q. You went home in 1909 and stayed two years in Leeds and then you went to Germany to the Dye laboratories of Messrs. Leopold Cassella & Co.?—*A.* Yes.

Q. And you found a good many Indian students there?—*A.* No, we were only two.

Q. They have a special instruction laboratory?—*A.* Yes, for everything, cotton and leather.

Q. Especially arranged for training students to use their dyes?—*A.* Yes.

Q. When you left Germany you went to Milan?—*A.* Yes.

Q. What processes of tanning were they using in that factory?—*A.* That was a very big factory. They were tanning box calf by the chrome process.

Q. Is this tannery connected with Lepetit Dolphus & Co.?—*A.* No.

Q. They were not using their products?—*A.* They might have been using their extracts.

Q. Did you go into this tannery so as to be trained in the method of using these extracts with a view to introducing them to India afterwards?—*A.* No, that was not the idea. It might have been the idea in the dye works of Cassella, but it was not in this Italian firm.

Q. You came back to India and joined the tannery of Dr. Sircar. When was that started?—*A.* I think it was in 1905.

- Q. Before you came back ?—A. Yes.
- Q. You don't know who started that ?—A. A student who was trained in the Madras, School of Arts, Debendro Choudhury. He was the first man.
- Q. Now you are tanning chrome leather ?—A. We are making box sides, all colours, black, light brown and chocolate.
- Q. Did you experience difficulties lately on account of the supply of chemicals ?—A. We held a large stock of chemicals, and are still getting a supply, but at an enormous price.
- Q. What is the principal chemical that you use for tanning, chrome alum or bichromate ?—A. We use both, whatever we can get. If we get chrome alum we use it. There is no standard ; nowadays chrome alum is almost prohibitive, so we are using the other.
- Q. With the two bath process ?—A. No, one.
- Q. Have you got any chemical assistants or are you dependant on your own chemical knowledge ?—A. I am my own chemical assistant.
- Q. Have you got a good knowledge of chemistry ?—A. I have.
- Q. Have you any educated people in your tannery, who are working there ?—A. Yes.
- Q. You mentioned that you have two assistants ; have you any science graduate working in your tannery ?—A. No.
- Q. Do you want to get any ?—A. I don't want at present.
- Q. You don't want to develop your tannery ?—A. We do.
- Q. How are you going to do so without trained assistants ?—A. We must extend our tannery first.
- Q. Don't you think that would be putting the cart before the horse ?—A. I don't think so. I cannot increase my establishment without extending my tannery. What work I have to do I can do with my two assistants. When my work is extended and my output increased, I shall be very glad to take a graduate.
- Q. You say you think this is a splendid opportunity now to develop the trade in manufactured leather in Bengal ?—A. Yes.
- Q. What class of leather would you make from materials in the Calcutta market ?—A. The best would go for chrome tanning ; the cowhides and some of the buffalo hides may also go into chrome tanning for making picker bands.
- Q. Have you tried making picker bands ?—A. I have tried, but have not put my material on the market, but think I will succeed ; in fact I have had enquiries for it from the mills.
- Q. Have you made any picker bands yet ?—A. I say I have not, but I am experimenting with it and I think I shall succeed. I have not made them for sale yet, but have made samples in the tannery, but whether they stand the test in actual work I don't know.
- Q. Have you been making chrome buff leather ?—A. Yes.
- Q. Have you cut any picker bands out of that leather ?—A. Yes, I have done exactly that.
- Q. Have you sent any of these to the weaving sheds to be tried ?—A. I have not.
- Q. Why don't you ?—A. I am going to do it.
- Q. Have you been making any roller leather ?—A. No.
- Q. In the evidence you have placed before us you have drawn up a scheme for the development of the leather trade, and you have discussed in that note the staff that would be appointed for a leather Trade school. This scheme is drawn up on the lines of the Leeds University ?—A. Yes.
- Q. Supposing that Government starts—as a matter of fact Government has already started—a Leather Trade School, the question is whether it should be a school run on the Leeds line, in which laboratory work only is done, or whether it should be a demonstration factory ?—A. I want both of them to be combined in that school.
- Q. The leather trade goes on all over India, and I suppose you would naturally like to see the school in Calcutta. From the broad point of view, is Calcutta the best place to set up such a school ?—A. Calcutta is the best place, that is my view.
- Q. Have you in your tannery any modern machinery ?—A. Yes, we have chrome tanning machinery.
- Q. A splitting machine ?—A. Yes.
- Q. Where do you get your workmen from to run these machines ?—A. We had some difficulty in the beginning with that splitting machine ; then we got an ordinary mechanic and he has been trained up.
- Q. Taking that as a typical machine, once it started, was there any difficulty in keeping it at work ?—A. None at present ; it is giving me satisfactory work for the last two years. Of course we don't split the hides too thin. For our purposes they are all right.
- Q. Are you doing any skin tanning ?—A. Not very much.
- Q. You don't use the splitting machine on that ?—A. No we have not been doing much skins ; we do all hides.

abu M. N. Ghose.

Q. Supposing that you had large tanneries, do you think there would be any difficulty in training labour in Bengal?—A. I do not think so; I have not experienced any difficulty save and except with that splitting machine.

Q. How many men have you in this tannery?—A. In the tannery I have got about 50 men, and in the boot department another 50.

Q. Have you got any boot-making machinery, or is it all done by hand?—A. We have got most of the machines.

WITNESS No. 89.

BABU M. N. GHOSE, *Manager, the Jessore Comb, Button and Mat Manufacturing Co., Ltd., Jessore.*

WRITTEN EVIDENCE.

Capital.

On my return from Japan, I, in conjunction with several local gentlemen of Jessore, started the Jessore Comb, Button and Mat Manufacturing Co., Limited, in the year 1909, for which we wanted Rs. 50,000. But capital in this country being extremely shy, it was with the utmost difficulty that we could secure only Rs. 25,000 in the course of three years. It was consequently very difficult for us to go on with the work, and the attempt to raise a loan of a few thousand rupees from some local and Calcutta banks on the security of machinery and manufactured articles failed. People often demand almost absolute certainty of profits, even in the case of industries which have been well established, so that experts or managers, whose time should chiefly be devoted to the supervision and management of the factory and office, have to go about canvassing the country for the supply of capital, with the result that such canvassing, instead of helping us in raising the capital, materially affects the effective supervision and control of the concern. Thus it will appear that what is done by professional canvassers in other countries is being chiefly done here by the experts themselves so far as the industries managed by Indians are concerned.

Government assistance.

As regards my suggestions for removing the difficulties in the way of raising the capital I shall deal here with question 5. I think no industrial ventures can succeed and give the people of the country a decent means of livelihood unless they are taken under Government protection, supervision and patronage especially in case of new and infant industries. Investors in this country find more profit in banking and money-lending businesses. It is well-known that the various loan offices in the mofussil towns of Bengal, which ordinarily pay not less than 6 per cent. interest on fixed deposits, are prosperous and thriving concerns and that in the presidency towns wealthy people prefer investment of their moneys in banks giving interest at 4 per cent. to laying out capital in uncertain business enterprises. The reason is not far to seek. Of late several industrial enterprises of Bengal have recorded dismal failures and have ruined many humble investors by their sudden collapse, though they were started under the inspiring enthusiasm of dawning national self-consciousness. People, rich and poor, in their first flush of enthusiasm poured out money to make them a success, and I may be permitted to say that these industrial undertakings, the failure of which was due to ignorant, unscrupulous and inefficient management in most cases, would not have died prematurely, had the Government come to their rescue as in the case of co-operative credit societies.

Here it can be safely stated that the industries which I represent as well as other similar industries are quite new in this country and are still in their infancy. Hence much more difficulty is experienced in raising capital for such concerns, as the people are now diffident to subscribe to their funds. To obviate this difficulty I should propose that Government aid as stated in question 5 is necessary for the raising of capital. My suggestion therefore is that the Government should help our infant industries either by advancing loans at a nominal interest, say 5 per cent. or guaranteeing dividends at 6 per cent. at least, for this will attract the investing public and at the same time encourage banks and suppliers of machinery and raw materials to allow credit to the concerns.

But even when the required capital is fully subscribed and articles manufactured attain the desired finish and quality, there is great difficulty in pushing them in the market in competition with similar cheap foreign made articles manufactured under favourable circumstances, unless the Government again comes forward to help those industries with State bounties or high protective duties till they can stand on their own legs. The Government purchase of products at a reasonable profit to the producers will also go a long way to establish those industries producing articles generally used by Government and I trust the Government will not hesitate to purchase such articles even at a higher price to encourage local industries.

So far as my experience goes, capital is principally drawn from professional people and a few landholders.

pioneer factories.

I have no personal experience of any pioneer factories in India but have seen some in Japan. At the present stage of our struggle we need some Government pioneer factories to lead us on. What Japan did in this respect may be followed here with profit. The following extracts from Professor Hamilton's remarks may be interesting :—

"Since 1870 the Government of Japan commenced model factories, and a silk spinning mill was started in that year. A model mill was also established for cotton spinning and the

supply of spinning plants on easy terms to the people was initiated. A model filature was started with a view to popularise labour saving appliances in the manufacture of raw silk, and the workmen trained there were spread all over the silk districts. A glass factory and a paper mill were established in 1876. Machine making, soap making, type founding and porcelain making followed in quick succession and imparted a powerful impulse to the progress throughout Japan. Meanwhile factories modelled after those established by the Government began to be started by the people, and the Government no longer perceiving the necessity of maintaining its model factories began to sell them about the year 1880."

Since the existing banks do not as a rule offer any facility to industries under Indian management, the establishment of Industrial Banks in all industrial centres financed by Government is urgently required. These banks will render financial aid to industries according to the needs in each case. Banking facilities.

There should be commercial museums in all the principal towns of India and periodical exhibitions should be held there. In these museums side by side with indigenous products there should be exhibited similar foreign-made articles with their places of origin and prices noted against them. In each museum there should be at least one good and competent consulting chemist whose duty will be to analyse samples and to explain the processes of manufacture whenever necessary. An industrial journal in this connection will be of much use to all interested in industries and commerce. Reference libraries should also be attached to each museum. In this connection I may say that the Calcutta museum has done much in the way of advertising our goods and as such has helped us much in securing customers from other provinces as well. We have been highly benefited by this institution. Commercial museums.

The principal Government departments using imported articles should publish lists with prices of those articles and exhibit them in the commercial museums. The list should contain their sources of supply and the rates at which the Government purchases them. Some responsible Government officers of the purchasing departments would do well to visit the local factories manufacturing Government requirements and help them with their suggestions. The last part of my answer to question 5 may be referred to. Government patronage.

The present law for the acquisition of lands should be so modified as to enable Government to acquire lands for and on behalf of industrial companies whenever necessary. Land policy.

As regards labour which is chiefly drawn from the working and the middle class people we experience much difficulty in improving the labourer's efficiency and skill. In these days of keen competition and high prices of the staple food and other necessities of life, the labourers usually demand higher wages than our funds permit. While we pay wages at the rate of Rs. 8 to Rs. 10 per month, the ordinary labourers can easily earn Rs. 12 to Rs. 15 per month under the agricultural classes of Bengal. Moreover, the number of local labourers is getting small on account of malaria. This causes a great demand for foreign imported labourers, both by the Bhadralog and the agricultural classes, who offer higher wages and other inducements to retain their services. Training of labour.

In our factory, in addition to the working class, we have some Brahmins, Kayasthas and Khatrias, who, however, soon leave the factory as soon as they get better openings elsewhere. Owing to the want of regular supply of work arising out of the paucity of our funds, we are unable at present to retain the services of skilled and efficient labourers, who always try to secure some permanent jobs on higher wages for the maintenance of their families. Of course under the management of good experts we may turn out efficient hands; but the problem before us is how to retain their services in the face of keen competition, want of sufficient working capital and the insanitary condition of mofussil towns of Bengal referred to above. As regards working capital, I may quote here Mr. Swan's report:—

"Adequate capital is particularly necessary in the case of industries run by Indian capital and under Indian management owing to the reluctance of banks and of firms that supply machinery and raw materials to give them credit. When a concern has to pay cash for its raw materials and at the same time to allow credit to its customers, it must have at its command much more working capital than a similar business which enjoys the usual banking facilities."

Young men coming out from technical institutions should undergo a period of apprenticeship in some established factories and thus qualify themselves for the responsible duties of experts, supervisors or managers as the case may be. Training of technical staff.

State scholarships should be given to experts for studying foreign methods at an interval of four or five years. The Government should also assist them in getting admission into factories in foreign countries and see that every facility is given to them for utilising their time to the best advantage.

In this direction too we can follow the Japanese with some advantage. How Japan so suddenly emerged from the position of an agricultural country to that of a leader among industrial nations is worth our careful consideration. Side by side with the encouragement of industries, technical schools and colleges were established throughout Japan. Besides the four Universities that impart scientific training in the various faculties, there are 14 special technical colleges, 391 technical schools and 4,908 supplementary technical schools. Colleges of commerce.

Considering the area and population of India, we require at least five times as many institutions as in Japan to impart efficient technical and commercial training to our young men.

Save and except in the case of agriculture, the dissemination of information should at present be through English.

r Government
ications.

Besides the trade journals in connection with museums, each technical college, especially those imparting chemical knowledge, should have a journal of its own, where the professors and the students can publish the results of their researches and investigations.

Occasional articles from those trained in foreign countries and engaged in local factories will help the students much.

way freights.

The present inland-railway charges, both parcel and goods, are very exorbitant. These should be considerably reduced for carrying raw materials, machines and finished articles.

We took up the manufacture of mats from grass reeds but had subsequently to stop it on account of the excessive railway charges of reeds from Midnapore to Jessore. We experienced the same difficulty on the occasion of His Excellency the Governor of Bengal's visit to our factory when we brought some sulphuric and nitric acids and methylated spirit for experimental purposes from Calcutta to Jessore, a distance of 74 miles only. The railway freight was so very heavy, nay prohibitive, that the cost of celluloid became twice as much as we estimated.

eral.

Manufactures of the following articles may be taken up with much profit to the organisers :—(1) bone and horn products, (2) tanning, (3) jute and hemp products, (4) Coconut shell and fibre products, and (5) date sugar industry.

(Witness here gave confidential evidence.)

ORAL EVIDENCE, 29TH NOVEMBER, 1916.

Mr. C. E. Low.—Q. I understand that you are the manager of the Jessore Comb, Button and Mat Manufacturing Company. That you say is a limited company. You wanted a capital of Rs. 50,000 and you could get only Rs. 25,000. Have you not succeeded in getting a loan so far?—A. I tried very hard to get a loan from the loan offices in Jessore and from the local banks and also some other banks. None of them wanted to give us a loan of Rs. 5,000 on the security of machinery, raw materials or stocks.

Q. How did you get hold of the premises?—A. It is not free hold. It is municipal land taken on lease for 99 years.

Q. Would the capitalists not give you any money or did they charge high interest?—A. They did not want to give us any money at all.

Q. What technical training have you had?—A. I had technical training in Japan, especially in celluloid and celluloid article making.

Q. Making combs, buttons, etc., out of celluloid?—A. Yes.

Q. How long were you in Japan?—A. Three years.

Q. Were you at any Japanese Government institution?—A. I was in a Japanese Government institution as I wanted to learn the camphor trade which is a Government monopoly. There I had been only six months for watching the cultivation of camphor plants and the production of raw camphor. But most of my time was spent in learning the manufacture of celluloid.

Q. Jessore is your native town?—A. It is my native town.

Q. Are there not any financing agencies or firms in Jessore?—A. There are three financing agencies. They advance money only on houses, landed property, ornaments, etc.

Q. They are not banks but money-lenders?—A. Yes. But there is a trading corporation also.

Q. Is that the one with an authorized capital of 10 crores?—A. No. Its capital is only one lakh.

Q. What staff do you employ at the factory?—A. Generally people from the middle class. Apprentices I may call them.

Q. Do you get men from the Bhadrolog class?—A. I get only Bhadrolog class now.

Q. They work at the machines with their hands?—A. Yes.

Q. How much pay do they get to start with?—A. They start from Rs. 7. But as time goes on I have to increase their wages. The first man now gets Rs. 20 and others get Rs. 17, Rs. 15 and so on.

Q. Do these men possess any qualifications at all, I mean educational qualifications?—A. Not very high. Most of them have only elementary education.

Q. You say that if dividends were guaranteed at 6 per cent. by Government, then the public would invest. Which do you think would be better, to guarantee the dividend to an industry, or guarantee dividends to a bank in order to enable it to advance?—A. If the Government guarantees dividends, then we may get help from the banks also.

Q. Which do you think people will sooner invest in, an industry with a dividend guaranteed by Government or a bank on the same conditions?—A. I think the banks.

Q. You keep some of your stuff in the commercial museum. Do you find any sale arising from it?—A. I have got a market in Madras and Bombay through the museum.

Q. Supposing these museums were further developed would it improve your custom?—A. Certainly so. We should have as many of them as possible.

Q. Would you like to have arrangements for sales?—A. We have ready sales for all our manufactures at present.

Q. What is your turn-over in a year?—A. About Rs. 12,000 worth.

Q. You sold them readily?—A. Yes.

Q. Do you find that the imported combs compete with your goods? Are they sold cheaper?—A. The Japanese articles are selling cheaper. The German and Austrian articles are not selling so cheap. I am competing with them successfully.

Q. Are the Japanese articles better?—A. The price is cheaper but the article is not good.

Q. What is your things made of?—A. The same material.

Q. You do not find any difficulty in getting your raw material?—A. Now we do not get raw material at all.

Q. How do you make combs?—A. Formerly we used to get celluloid from Germany. The thing is that after seeing so many dismal failures in industrial undertakings in this country we took extraordinary precautions. Now having seen a prospect of making the business a success we have advanced the capital by the addition of another Rs. 10,000. In that year we made some profit. So the organisers were encouraged.

Q. In what year?—A. 1912-13 and also 1913-14. Our ulterior motive was to make celluloid ourselves. In the meantime the war broke out.

Q. Of what material do you make combs now?—A. Horn. For this, we have to train the labourers again now.

Q. How long does it take to train the labourers?—A. We took this business up only during the last six months and they are not well trained yet. I think that another six months would be required. In the meantime we have sent for celluloid machines from Japan and we do not know whether we shall get them.

Q. Can you get camphor?—A. We can get that from the local market.

Hon'ble Pandit M. M. Malaviya.—Q. You say that you have tried to get loans from local banks on the security of your machinery?—A. They would not give us a loan on that security. They said that the machinery is not worth the material it is made of.

Q. Do you mean to say that your factory was going on as a working concern and turning out good articles, and you wanted a loan on the security of your machinery and yet they would not give it to you?—A. Our managing agent is a zamindar, and on his executing a note in his own hand and on taking the responsibility on himself, we were advanced Rs. 2,000 and the rate of interest was 12 per cent. Every month we were asked to clear our debt.

Q. You think then that if there is a bank which is started by Government with the object of financing industrial enterprises, a concern like yours which is turning out goods in a fair way would be able to obtain accommodation?—A. Yes.

Q. If you had an industrial bank supported by Government do you think this bank could afford the necessary help to the smaller industries also?—A. That could be done at a later stage. The industries in the beginning should have some capital and when the articles are produced and approved by the market, then the bank could help.

Q. You think that Government should come forward to help to start industries in the initial stages either by advancing loans at nominal interest or by guaranteeing interest?—A. Yes.

Q. You wish the Government to start pioneer factories on the lines of Japan? Have not these factories that you speak of multiplied in Japan?—A. Now the Japan Government need not start factories. The people have now well understood the processes.

Q. They have multiplied?—A. Everywhere there are factories. In fact every house is a factory. I lived in Osaka for some time. It is bigger than Calcutta and every house is a factory, where something or other is being manufactured.

Q. Has the money that the Japanese Government spent been repaid many times?—A. I think that in the course of the last two years it has been more than amply repaid.

Q. Have you seen the supplementary technical schools of Japan? Have you been to any of them? What is the course of instruction that they provide?—A. Yes. In the commercial branch the important subject that they take up is banking.

Q. They supplement the work of the general elementary school and they give an elementary kind of technical instruction?—A. I have seen several technical schools in Japan. I remember some of the subjects that are taught there. They take up a number of special subjects. For instance in some they take up dyeing, in others porcelain, carpentry and so on.

Q. These 391 technical schools that you speak of are schools above these supplementary technical schools? Do they correspond to our high schools here or are they higher than that?—A. Yes. As they give practical instruction we cannot compare them. In fact the training that is given there in the middle vernacular schools many of our graduates do not get here.

Q. You speak of 14 technical colleges. Are they the highest type of technical institutions?—A. Only those who pass from the technical schools are allowed to enter these colleges.

Q. They receive their finishing education there?—A. Yes. Most of the students from these colleges are selected for training in foreign countries and they are given scholarships.

Q. Out of these students those who show promise are sent to foreign countries?—A. Generally. The experts of private factories are also sent by Government to foreign countries at Government expense.

Q. Do the Japanese Government even now send a large number of students to foreign countries?—A. I came from Japan in the year 1909. Till that time they used to send only a limited number. I do not know now what they are doing.

Hon'ble Sir F. H. Stewart.—Q. You say that Jessore is your native city. Is that the only reason that you started your factory there?—A. Our president who was the organiser of the factory was the landowner of that place. He helped me to go to Japan for education. It was at his suggestion that the factory was started in Jessore.

Q. You have spoken about your difficulties on account of the freight rates. Could you not move without much loss and inconvenience to a better centre?—A. We are just thinking of removing our field of activity to Calcutta on account of these difficulties. In fact we are now compelled to do so.

Q. How many men do you employ?—A. At present we employ only 20 men.

Q. Could you get your labour without trouble in Calcutta?—A. There may not be any difficulty in getting men but we shall take a year to train people here again.

Q. You say that you have an idea of making your own celluloid. Is that a feasible proposition?—A. That is feasible in Calcutta, not in Jessore.

Q. You say that you had great difficulty in securing money. Will you be able to get the additional money for manufacturing celluloid?—A. From the public I could not get anything. I tried my best to get it first from Bengal and then I had been to Burma for capital. There too I could not get the required capital. I was rather disappointed and then I approached the Maharaja of Kasimbazar who has promised to advance the money on his own private account and in fact he has already paid the sum required for the machinery.

Q. You cannot get the machinery just now?—A. The Japanese people have promised to send the machinery and I have sent the money.

Q. You say that the Japanese are your formidable competitors. Do you consider that in quality their articles are better?—A. I consider mine is better.

Q. In appearance and finish how do they compare?—A. In appearance and finish their goods are not bad but they are not durable at all.

Q. How is it that they are able to undersell your goods?—A. When they want to compete with any foreign country they get large Government bounties in Japan.

Q. Do you know this personally as a fact?—A. I have heard it stated freely in Japan.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. You say that the present law for the acquisition of lands should be modified. In what way do you want to modify that law? You want the other people's land to be purchased for you cheaper than the market price?—A. Not cheaper. It should be modified with regard to particular locality that is wanted. For instance if we require for industrial purposes land which is close to the river side or to the railway side and if the land belongs to a private party we cannot get it very often. They may refuse to sell it altogether. We felt the difficulty in starting our factory. The land on which our factory stands belongs to the Jessore Municipality. We wanted to purchase the land and only by persuasion and influence we got the Commissioners to give us the land at a price higher than the neighbouring lands and on conditions which would be considered ridiculous. They have put the condition that if this factory is removed or liquidated or anything of the sort happens then the land with the buildings and the machinery would go to the municipality.

Q. So you want the land to be acquired for you by Government?—A. It would be better just as in the case of railways.

Q. The railways are useful to the public whereas the factory can only profit one individual?—A. Our people have got to be convinced that industries are also useful to the public. Otherwise serious inconvenience will be caused.

Q. About these Japan schools and colleges are the technical schools a sort of feeder for higher schools?—A. Yes. From secondary schools they also go to the factories.

Hon'ble Sir R. N. Mookerjee.—Q. Do you think that any bank would finance your concern, if you cannot show that you are making a profit?—A. That is the stage at which we are now. We are not getting any help from banks although we are making some profit.

Q. You are a business man and I am putting you a very simple question. Do you think that the banks would be able to advance any money when you cannot show that you are making any profits?—A. In the years 1912-13 and 1913-14 even when we declared dividends we could not have loans from banks.

Mr. A. Chatterton.—Q. How much dividend did you declare last year in your comb factory?—A. 4 per cent. in 1912-13 and the same thing in 1913-14. *Mr. C. W. F. Cockburn.*

Q. Where do you get your celluloid from?—A. We used to get it from Germany before the war.

Q. And now?—A. We do not get it now. We placed some orders with a Japanese firm. They showed one sample and when we ordered we found that quite a different thing had been sent. We have stopped the orders now.

Q. You have turned to horn now?—A. Yes.

Q. What is the economic advantage of establishing an industry in which you have to import all your raw material and simply cut them up and put them on the market?—A. Our ulterior motive is to manufacture celluloid ourselves.

Q. Have you made any progress in this direction?—A. We could not do it during the war. The people have lost all confidence in limited concerns. Otherwise we should have done it in the ordinary course of things. I have, however, induced the Maharaja of Kasimbazar to start a celluloid factory which will supply our requirements at Jessore.

Q. What are the raw materials that you use for making celluloid?—A. Cotton and acids, sulphuric and nitric, spirit and camphor. These are the ingredients.

Q. Which is the most expensive, the acid or the cotton?—A. Camphor is the most expensive.

Q. If you are going to start the celluloid industry would it not be better to establish it near acid works?—A. That is what we are thinking of. We shall take up a house near the Bengal Chemical and Pharmaceutical Works in Calcutta.

Q. Do they make sulphuric and nitric acid? Do you propose to make celluloid alongside the acid factory and in that way to avoid all cost of packing and carriage of the acid?—A. Yes. Moreover we can resell the acids which are once used. That we cannot do from Jessore. The railway freight will take up the whole profit.

Q. Have you got much stock of manufactured articles in your factory?—A. Not at present.

Q. Why did you not start your factory at a place where you would avoid big railway freight?—A. Personally speaking I am willing to come down to Calcutta. But our organisers are not willing to part with the factory. They want to have the name of Jessore. For the last three years I have been pressing them. I tried to convince them that Jessore is not the place for taking up the manufacture. They want to have the name of the district.

Q. That is common in Bengal?—A. That is our weakness rather.

(Witness here gave confidential evidence.)

WITNESS No. 90.

Mr. C. W. F. COCKBURN, Honorary Secretary, representing the Kodarma Mica Mining Association.

WRITTEN EVIDENCE.

I have the honour to forward you herewith answers to some of the questions in so far as they are applicable to the mica industry, and have incorporated these answers in the form of a treatise which will perhaps be the most satisfactory manner of dealing with this subject

I propose to deal with the subject from the following points of view :—

Firstly, its importance.

Secondly, the conditions under which the industry is at present being carried on and defects.

Thirdly, suggested remedies for these defects.

Firstly, its importance.—The mica industry is one of the utmost national importance, The mica more especially at the present time. The district of Hazaribagh and parts of the adjoining districts of Gaya and Monghyr form most important mica producing areas: the greatest production being from the Hazaribagh district.

Mica in its various forms is an absolute integral part of practically every electrical appliance and apparatus, and is absolutely indispensable. With the growth of the electrical industry the supplies of mica will have to grow in proportion.

In this present war very large quantities of mica are being used in the manufacture of munitions, and, therefore, the mica industry has become one of the key industries of the Empire: in other words it is an imperial asset.

Secondly, conditions under which the industry is at present being carried on and defects.—This key industry is at present working under regulations which not only permit of ruthless waste of the existing deposits and badly worked mines, but do not provide any remedies.

In the earlier days of this industry, practically all the mica produced was on or quite near the surface, and consequently there was no great need at that time for the enforcement of regulations and restrictions concerning the conservation of the deposits: although, if there had been some regular method insisted upon with regard to the conservation of the deposits and mines, the industry would have been in a much better state than it is to-day. Since those days, however, practically all the surface deposits have been exhausted, and it has now become necessary to treat mica mining on regular scientific principles, that is to say, the installation of machinery has become necessary, and generally speaking mines have to be worked on regular mining methods in order to conserve the mines and to obtain the best and most durable results.

The Indian Mines Act is, in effect only concerned with the safety of the labour working in the mines, but is not in any way concerned with the welfare of the mines themselves. Inspectors of mines under whose jurisdiction the mica belt falls are practically all men who have been trained in the collieries, and therefore it is not unnatural for them to gauge mica mining by their experience of coal mining.

Coal is found in regular seams which can be tested, whereas mica exists in extraordinary veins and pockets, and cannot be tested by means of boring.

From the above it will be clearly seen that the mica industry requires treatment suitable to the industry, and cannot be coupled up with any other class of mining, such as coal.

There are no regulations or restrictions on the method of mining. Any one can do exactly what he likes in the way he works a mine. There are instances without number in which the deposits have been followed down to a certain depth in the most irregular way, and when the deposit has appeared to diminish in value the workings have been left and the pillars cut, and any further exploitation has become impossible through the former entrances. If it is found desirable to open up such a mine again the only method is to drive a vertical shaft at a safe distance from the old workings, and then to drive a horizontal shaft or drive from the vertical shaft at a depth where safety will be secured from the old workings, or other similar methods.

This not only means a big capital outlay, but also a loss on that part of the deposit which has been left in the old workings, and also that part of the deposit which for the sake of safety has had to be left between the new and lower area and the bottom of the old workings. All this could have been saved if the restrictions had been such that it was not possible for any one to destroy the future prospects of the deposits or mines.

like regulations.

The existing police regulations are such that those who wish to steal mica can do so with impunity. The reason of this is that the same quality and colour of mica can be found at two ends of the area, and also in the middle at one and the same time, and therefore the question of *identification* is practically impossible.

The mica has not only to be claimed by the rightful owner, but has also to be *identified* by him in order to convince the police authorities, and afterwards the court of justice, in order to secure punishment for the accused. This theft of mica has grown to alarming proportions, and is growing worse and worse day by day. The result of this is that those who have outlaid capital in the developments of their mines are not permitted to obtain the full benefit from their efforts in that they are not allowed to have all of their own mica.

chnical know-
ge.

There are concerns who have the best intention of working their mines properly with a view to their conservation, but are unable to do so owing to the lack of proper technical knowledge.

Thirdly, suggested remedies for the above defects.—Regulations and restrictions should be placed upon the industry to enforce the working of mine deposits in a proper and miner-like fashion, and such regulations and restrictions should be thoroughly insisted upon.

Such regulations should make it impossible for any miner to work the deposit merely for his own interest to the depreciation of the Imperial asset.

It is suggested that Government should appoint a special inspector of mines who has had a thorough knowledge of metal mining—not coal mining. Such an official should, before he enters upon his duties, be attached to all the more important mining concerns, one by one, in order to thoroughly learn and appreciate all the true conditions under which the industry is at present being worked, so that he may afterwards know exactly the feelings and conditions of those concerns whose mines he will ultimately have to inspect on behalf of Government.

It is further urged that the Government should work in co-operation with this Association in regard to the appointment of any such official inspector of mines, and that after such mines inspector has taken up his duties, that he in turn should work in co-operation with this Association whereby he will derive the full benefit of the experience gained by the Association from all general points of view.

Referring to the second difficulty, theft of mica.—The practical solution to this difficulty will be the removal of the onus of proof from the shoulders of the rightful owner of the mica stolen to the shoulders of the person accused or suspected of stealing it. The existing police regulations for Howrah form a satisfactory basis for this:

The third difficulty, i.e., want of proper technical knowledge.—The suggested appointment by Government of a special inspector of mines might easily be the means of supplying technical knowledge to those persons and concerns who now lack this. Lectures should be given,

say, once a week or once a month, in order to instruct the managers of mines how to overcome their numerous difficulties, after of course, any such official has become thoroughly acquainted with all local conditions. In this way an official appointed by Government could perform the joint duties of the Government inspector of mines and technical instructor.

In reviewing the above, it is obvious that even if the present system of regulations both under the Mines Act and the Police regulations and the absence of proper technical instructions were not matters of such great importance in the early days of this industry, they are to-day matters which require immediate rectification after the most serious consideration. The whole of the industry has changed not only from a mining point of view, but as regards its importance amongst the key industries of the Empire, and therefore it should receive treatment which is absolutely suitable and it should not be coupled up with any other mining industry such as lime stone, manganese or coal, etc., but such regulations and restrictions should be applicable to the mica industry only.

There is no doubt that the introduction of proper regulations and restrictions will, to some extent, revolutionize the industry, but this is most necessary for the future welfare of the industry.

In the absence of such restrictions the ultimate fate of the industry will be sealed, and all the deposits will, for the most part, have to be abandoned although still containing large quantities of mica.

In order to help the mica industry, it is absolutely necessary and of the most immediate importance for Government to take such steps that will prevent the theft of mica, and thus allow those who are doing their best to work their mines properly to receive the whole of their output, and thus afford them a reasonable chance of success.

Although I have only mentioned three main defects, yet there are many other defects such as the want of proper road communications in the district, special regulations in regard to the Kodarma forest and facilities to those working in the Kodarma reserved forest, but these points can, no doubt, be discussed in Calcutta.

I am prepared to support the following statements in oral examination, and to give complete instances of the various defects mentioned.

ORAL EVIDENCE, 30TH NOVEMBER, 1916.

President.—Q. You are the Secretary of the Kodarma Mica Mining Association?—*A.* Yes.

Q. Can you tell us what the constitution of that Association is?—*A.* Most of the leading firms in mica in this district are represented usually by their Managers. The Chairman is the Deputy Commissioner of Hazaribagh *ex-officio*.

Q. Have you any qualifications for membership?—*A.* Members must be the proprietors of a mica mine or mines or their proxies.

Q. Do you elect the members?—*A.* The members are elected at a general meeting on a majority of votes, and I am directed to make all the necessary arrangements for their formal entry.

Q. Can you tell us how many there are?—*A.* There are eleven. They include mica miners in the zemindaris. The amount of mica land in the Government reserved forest is not really very large. It is large in itself, but not in proportion.

Q. Do you know anything about the Bihar and Orissa Mica Association?—I have heard of it, but the whole thing, I think, fizzled out.

Q. How long have you yourself been engaged in mica mining?—*A.* Six years.

Q. What mines are you controlling?—*A.* Personally I am not controlling any mines now. We have a mines department actually controlling the mines. I was superintendent of the mines department for some little time.

Q. You are under Messrs. Chrestien & Co., Ltd.?—*A.* Yes.

Q. Are most of your mica leases in Government land or zemindaris?—*A.* We own a good deal of area in both.

Q. Are the conditions for mica mining similar in both the areas, that is to say, in the form of lease?—*A.* No. They are not similar.

Q. Would not that stand in the way of any kind of regulations dealing with the question of mica thieving?—*A.* Not at all.

Q. Would it be possible for the Government to control mica mining in Ganwan and other zemindaris?—*A.* Yes.

Q. They could not interfere with the terms of the lease I suppose?—*A.* I do not think that it would make any difference. Any restrictions or conditions that Government might like to impose would, I think, be entirely outside the existing leases from ordinary zemindars.

Q. Would it be possible to impose restrictions consistent with the terms of the leases?—*A.* I should think so.

Q. Is it possible for a man to have a very small plot, or is he compelled to take up a plot of a certain size?—*A.* I am talking of both Government land and zemindari land.

Q. In the case of Government he can take up a plot of one square which usually amounts to about 40 acres, and in the case of an ordinary zemindari he can buy a hukumnamah for about Rs. 5 and make a hole and produce a considerable amount of mica.

Q. That is a means of covering mica thieving?—A. Yes. One of them.

Q. The way in which a man gets a small lease with facility?—A. Yes. It is quite easy for a man to arrange with a zemindar to pay him a nominal amount, such as Rs. 5; and then to raise mica worth Rs. 25,000 to Rs. 50,000 or something like that. Under the present conditions it is impossible to do anything to stop thieving, the difficulty being the question of identification.

Q. You cannot identify a sheet of mica in any way?—A. No. If you find a man selling and even if you catch him almost red-handed, he goes up to the thana and you are asked to identify the mica, which is absolutely impossible.

Q. The real onus is thrown on the accuser?—A. Yes.

Q. Many mica companies work by contract or through contractors?—A. Many do.

Q. They obtain leases and allow certain areas to be worked by contractors?—A. Yes.

Q. Does that system increase the facility for mica thieving, because the contractors themselves become receivers of stolen mica and hand over the thing to those from whom they have taken the contract?—A. One's own coolies are bigger thieves than any one. In a firm employing a large number of coolies each cooly has his little share. In our own case we lose about 50 per cent. of our output. The idea of having contractors really, as in my own case, is the only thing to do. In our own particular instance, in Ganwan, there are lots of people and if you do not employ them as contractors they simply steal mica from you and you have no control over them, and it is far better to have them as contractors under the present conditions. The only thing we can do is to take these people and employ them in our own property.

Q. You are driven in fact to recognise the practice of mica thieving?—A. Not that. We are not driven to recognise the practice, but we are driven to prevent a great deal more of it. In fact, we tried an experiment by not using these people as contractors in Ganwan and we found that the amount of stuff going out of Ganwan was considerably more than when we had them as contractors, and so we took them in as contractors. That is the only thing we can do and even then they rob us.

Q. I have heard it suggested that the difficulty may be removed if the Government appointed a limited number of agencies to receive mica for transport out of the district. Could a scheme of that kind be worked out by your Association?—A. It will lead to a good deal of complication. It is rather a complicated system.

Q. They would be the only people authorised to transmit mica from the district to the outside market, and their depôts would be in effect like custom houses at a port. You do not think that a scheme of that kind has been thought out by your Association?—A. We have not given it any serious consideration.

Q. I am asking you to think about this, because one does not want to adopt special legislation if the same good can be effected without legislation, which must cut across too many interests, because you have got zemindari land and Government land being worked together by the same concerns?—A. I can place it before the Association.*

Q. It would be the business of the authorised agent, before receiving mica to satisfy himself that it came from a mine?—A. Yes.

Q. And that would have a good moral effect even if it were not always effectual in checking thefts?—A. What would be the objection if the onus of proof is shifted?

Q. You will have to work that through the police, through their minor officials, and it may lead to abuse?—A. It will be very difficult to get at the figures of mica stolen. There are lots of mica receiving people.

Mr. C. E. Low.—Q. This proposal to shift the onus of proof on to the thief is an old question in Chota Nagpur? Have you had any discussions with the Local Government on the subject?—A. We offered the draft of a bill once on the occasion of Sir Charles Bayley's visit to Kodarma but it was not approved. Personally I should say it was a little too complicated.

Q. Why did they not approve of it? Did they express any opinion on the principle regarding the onus of proof?—A. No. It turned very largely on a system of licensing to trade.

Q. On local enquiry it was found that a large number of people engaged in mica were against the bill. It is very difficult to make effective suggestions of this kind made by the industry and not supported unanimously by the industry?—A. The difficulty will always be there. The people whose business is based on stolen mica do not ask any questions and any bill that is brought in is bound to meet with opposition.

Q. Did your bill depend on the shifting of the onus of proof?—A. I do not think it did entirely.

Q. Supposing you had special legislation shifting the onus of proof, to what area would you propose to apply it?—A. To the whole of the mica area in the district of Hazaribagh, Monghyr and Gaya.

Q. And also Nellore?—A. I cannot say.

* *Vide* Additional Written Evidence printed after Oral Evidence.

Q. You realise that this shifting of the onus of proof is a very serious departure from the ordinary principles of criminal law? It is said to be justified in South Africa because of the enormous relative importance of gold and diamond industries there, to which the mica industries of India bear no proportion whatever?—A. That is true. But mica is a key industry now. I am now acting for the Government of India for the collection of certain qualities of mica. They are of enormous importance. It is small in production but valuable in price. Of course I cannot say that the actual production is at all comparable with gold and silver or diamonds, but at the same time in its way it is equally important. As the electrical industry increases, still more care will be required to safeguard the mica industry.

Q. At present the difficulty is that an individual mine is not very concentrated. I mean all the workers do not go out by one or more ways which you can control and where you can search people when they go out?—A. That can be done. It might have some effect, but very very small, because a great deal of mica is actually stolen at night and it is impossible to guard every mine like that.

Q. Supposing, in addition to the suggestion made by the President as regards the transport of mica from the mica area, there is a rule that no one will be allowed to mine without a license, will that have a preventive action?—A. I think it would. Suppose a man has license for a mine and he still receives mica stolen from other mines I do not see how you are going to check it.

Q. But this would only get at the man who is obviously holding a bogus mine simply to receive stolen mica?—A. What about people who have not got mines at all, but who are merely dealers?

Q. The mines on the Government land are held under the mining and prospecting rules. The mines in the zemindari are not held under prospecting or mining leases, but simply leases from the zemindar?—A. In the case of leases that we have, they are leases for the mining rights of mica from the zemindar.

Q. Suppose the Government took up the mining rights from the zemindar so as to prevent a man from having a bogus mine? What are you going to call a mine?—A. If you go as far as the limit laid down by the Mines Act, it is 20 feet.

Q. What about all those pit holes under the 20 feet?—A. From these you can get quite a large amount of mica sometimes—I mean honestly.

Q. You could not discriminate the notorious receiver?—A. It will be very difficult. You may know all the notorious receivers and have a very shrewd suspicion that they are indulging in this particular kind of trade and I think it is very difficult to furnish sufficient proof to secure a conviction. I think the President's idea is quite sound, and it ought to be backed up by the shifting of the onus of proof. That is the only real way of controlling the thing.

President.—Q. The only suggestion which appears to me so far to be practicable is narrowing the channels of outlet; we might have one or two local agents, who can ascertain from the local gossip which are the doubtful exporters of mica. That might have a good moral effect?—A. I fully admit that in ordinary circumstances it must be most unjustifiable to shift the onus of proof. The reason of the suggestion was because something like that was required, and it is not a new thing entirely.

Q. Some system of money deposit system would keep out a lot of undesirables?—A. Not from earning a living, but from earning what they have hitherto been getting.

Q. You think it is possible for the Association to consider the suggestion that there should be one or two licensed depôts, and that no mica should leave the district except through these depôts. Would that interfere with the freedom of the individual and would it interfere with the trade?—A. I do not think so. I will put it before the Association.*

Q. You also complain that there is no suitable inspector of mines to control the mining operations in the district?—A. Yes.

Q. The present arrangement is that one of the ordinary inspectors of mines visits the district now and then?—A. Yes. About once a year, or when there is an accident he comes up.

Q. Consequently he does not see much of the mica trade and mica methods as a whole?—A. No.

Q. Do you think that the industry is big enough to warrant the Government appointing a first class inspector to control mica only?—A. I should think so.

Q. What is the value of the mica exported from Hazaribagh district including Monghyr?—A. I cannot tell you at present. I can give you that if you wish afterwards.

Q. Most of your mica comes from the zemindari tracts?—A. About one-half. At present we are doing more work in the Government forest than in the zemindaris. For various reasons we are not developing the property in the latter.

Q. When you are dealing with questions in the Kodarma forest generally, you have to deal with the forest ranger? He controls the mica mining operations?—A. No, only as far as the cutting of timber for mining work and for the carriage of machinery through the forest are concerned.

* *Vide* Additional Written Evidence printed after Oral Evidence.

Q. He will have nothing to do with inspecting your mines?—A. No.

Q. Who controls your returns for royalty? Who inspects your accounts with regard to the quantity of output?—A. We do not pay royalty.

Q. Don't you on the Government land?—A. We pay dead rent. Royalty was tried about 8 or 9 years ago and it was found to be a hopeless failure. After nine years of smooth running they want to try it again, which would be a mistake.

Mr. C. E. Low. Q. About the question of having an Inspector to instruct people in proper methods, there is some dispute as to what are proper methods?—A. The best way is simply to say, mining methods so far as they are applicable to mica. There are lots of people who are mining who simply mine for the present and not for the future.

Q. My point is this, would you not have difficulties if you do not let a mine owner take the responsibility for the methods in which he is carrying on his mining from the point of view of production?—A. Supposing in consequence of the advice given to him by the instructing Inspector he undergoes a big loss, is Government to be liable?—A. I do not think so. I do not see why Government should be liable. It is not Government fault.

President.—Q. Do you think that anything would be gained if we suggested to Government that an officer be placed on special duty for, say, one season, to examine the whole state of affairs in this area with regard to mining and discuss the matter with your Association and to report to Government, making proposals with regard to control of the industry in future? It would be difficult for us to form a clear appreciation of the local circumstances. It is obviously a variegated picture. There are some people who are quite willing to work honestly and in the best interests of the country, and there are others apparently with no regard to the future of the industry?—A. It would certainly be a good thing to have Government on their part send out a man to make a local enquiry.

Q. Has there been any such local enquiry made?—A. I have not heard of one. I take it the enquiry will be not only of the actual working and the method of working the mine, but the local conditions generally, because local conditions are a very important point. Road communications are bad; for instance, in the Kodarna forest, there are two roads and the Forest department allow Rs. 200 a year for the maintenance of these roads. The roads are under the Forest department.

Q. The Forest department is not expected ordinarily to make roads except for the purpose of carrying forest produce?—A. This road is not under the District Board but under the Forest department, and I think they get two or three times as much income from mica leases as they do from timber, and another thing is that the timber can never be worth much because the country is far too stony and rocky. I would not go so far as to say that the whole forest should be absolutely cut down straight away, but they should relax their present methods and support the mica industry much more, as it is their main source of support.

Hon'ble Sir F. H. Stewart.—Q. I gather your Association has not been able to devise any regulations or restrictions that they would recommend to be imposed on the industry?—A. We have merely agreed on the various points we have brought forward. In my particular case I have written the report as merely showing the existing conditions and giving a general outline of what might very well be introduced to put things right. That is the line I have taken. I do not know how far Government will be able to assist in the matter. Supposing we have a whole set of regulations and so forth, are Government going to take a real interest in it?

Q. About the inspector, you would have a man of very wide powers. Would you accept his decision?—A. You mean as far as the actual mining is concerned?

Q. Yes.—A. It is just a question of consultation. As long as we are conserving the mines he has an easy time. It will be in the case of the people who are not conserving the mines that he will have to insist upon certain methods of working after he is thoroughly acquainted with all local conditions. The mica industry is going through a change now. Mica was practically all on the surface and in the old days very little mining was done from a mining point of view. All these surface deposits have been practically worked out.

President.—Q. Somebody suggested that we ought to create villages in the reserved forest. Is that essential on behalf of the mining industry?—A. It will be a great benefit.

Q. Have the work people long distances to go to the mines?—A. I believe they have. Our mining engineer will be able to tell you more about this.

Hon'ble Pandit M. M. Malaviya.—Q. You say that the theft of mica has grown to alarming proportions. What is the extent to which it is stolen?—A. About 50 per cent. of our outturn.

Q. From the mica mines on Government land and private land?—A. Yes.

Q. On what basis do you say that it is about 50 per cent.?—A. There are various people who do business in mica but do not mine themselves, and we know pretty well what we have lost.

Q. Is there not any check upon the output of mica from any particular mine?—A. Under the present conditions there is no check.

Q. Don't you know roughly what amount of mica you have taken out of the mine?—A. We can roughly, when it is being taken out, when our coolies leave the mine and take mica to the mine godown.

Q. Is there no surveillance on the coolies when they go out of the area in which they are working?—*A.* It is absolutely impossible. You cannot do it. I heard of a case the other day. The Sub-Inspector caught a man but nobody came forward to claim the mica. That man had to be let off with his packet of mica. How can one know that the mica came from any particular mine or mines?

Q. You recommend the appointment of a special Inspector of Mines who should have received education in mining engineering?—*A.* Yes.

A. Is there any school at present in the country where mica mining is taught?—*A.* I do not know of one.

ADDITIONAL WRITTEN EVIDENCE.

(Submitted after oral examination.)

I am in receipt of your letter No. 3424 of the 18th June on the subject of the adoption of a limited number of agencies to receive mica for transport out of the district so as to remove the present practice of mica thieving.

As agreed I have placed this matter before the Association in the light of Sir Thomas Holland's suggestions but the opinion is that the existence of such Custom Clearing Houses would not be any check on the present practice of mica thieving. The reason being that such a check as these Custom Clearing Houses would effect is at a point which is beyond the actual stage at which the principal amount of thieving takes place.

For instance, supposing two persons called "A" and "B" were dealing in mica. "A" has regular working mines of his own from which he derives his output honestly. "B" is a man who has nominally a small mine but is able to keep up a fairly steady output by means of some arrangements with some of the coolies and sirdars in the service of "A." How would it be possible for the officers in charge of such Custom Clearing Houses to detect the fact that any of B's mica came from A's mine? It would be impossible to detect it.

It may be argued by those who are not thoroughly conversant with all the local conditions of mica mining that it is up to "A" to prevent the mica from his mine from going elsewhere, but this is not practicable owing to the fact that mica deposits are not confined to a limited number of mines such as could be provided with a reasonably reliable guard to prevent mica going astray, but they appear all over the country-side and most of the deposits are not in themselves large enough individually to make it practicable to maintain such a force of reliable guards and are moreover largely situated in the heart of dense jungle where tigers and leopards abound.

The main point is in the existence of the receivers of stolen mica and as long as they exist and create a market for stolen mica, mica will continue to be stolen.

From the above it will be seen that any check that could be exercised at the point where the mica leaves the district is too far along the line as the trouble does not occur at that point but at the point where the mica is taken from the ground.

At a second meeting which was held for the purpose of discussing this particular subject, I was instructed by the Association to procure a copy of the mining rules now in force in Mysore for gold and it has been generally agreed that the Mysore Mines Regulation, 1906, clauses 5, 6, 7, 8, 9, 10 (1), 10 (2), 10 (3), 11, 12, 13, 14, 15, 16, 17, 19 and 20 would possibly meet the needs of this present situation in mica.

I enclose a copy of the clauses and sections, etc., referred to, for your information.

It is not improbable that this matter will be discussed still further in the light of these Mysore rules and if any further decisions are arrived at, I shall be pleased to let you know, but at the same time, I do not anticipate much alteration in the views of the Association on this subject as the principle adopted in Mysore seems to be the only one which is likely to be of any practical benefit to mica miners in the suppression of mica theft.

MYSORE MINES REGULATION, 1906.

<i>Clauses applicable to Gold in Mysore.</i>	<i>Clauses as amended applicable to Mica.</i>
CLAUSE 5. <i>Mining materials not to be purchased, conveyed or kept without written permission.</i>—No person shall purchase or take in barter or exchange any mining material belonging to a Mining Proprietor without the written permission of such Mining Proprietor or his Superintendent, nor shall any person, without such written permission, receive, convey, or, except in such places as may be specially authorized, keep, any such mining material otherwise than for use for mining purposes on behalf of such Mining Proprietor or his Superintendent.	No alteration.

MYSORE MINES REGULATION, 1906—*contd.*

<i>Clauses applicable to Gold in Mysore.</i>	<i>Clauses as amended applicable to Mica.</i>
CLAUSE 6. <i>Penalty for unlawful possession of mining materials.</i>—Any person found to be in possession of any mining material without the written permission of a Mining Proprietor or Superintendent, and unable to prove that his possession of the same was obtained in a lawful manner, shall, on conviction before a Magistrate, be liable to the penalty provided in section 13.	No alteration.
CLAUSE 7. <i>Licenses required for gold dealers and goldsmiths.</i>—It shall not be lawful for any person to buy or sell unwrought gold or to receive unwrought gold by way of barter or pledge without a gold dealer's license, nor to carry on the profession of a goldsmith without a goldsmith's license as hereinafter provided. Provided that it shall not be necessary for a Mining Proprietor to take out a goldsmith's license on account of the smelting, refining or other preparation of any gold obtained from his mine by any persons acting on his behalf.	It shall not be lawful for any person to buy or sell <i>mica</i> or to receive <i>mica</i> by way of barter or pledge without a <i>mica</i> dealer's license, nor to carry on the profession of <i>mica</i> without a <i>mica</i> dealer's license as hereinafter provided. Unnecessary.
CLAUSE 8. (1) <i>Power to grant a license.</i>—The licenses referred to in section 7 may be issued by a Magistrate of the First Class on payment of such fees as the Government may by rule prescribe in that behalf, and every license shall terminate on the 31st day of December of the year in which it is issued. (2) Every gold dealer's and every goldsmith's license and every application for a license, shall, respectively, be in such forms as may be prescribed by Government.	No alteration. Every <i>mica</i> dealer's license and every application for a license shall be in such forms as may be prescribed by Government.
CLAUSE 9. <i>Power to cancel a license.</i>—No license shall be issued to any applicant unless the Magistrate is satisfied that he is a person of good character and reputation, and it shall be in the absolute discretion of the Magistrate to grant or withhold such license as he may think fit. Any license may be cancelled by a First Class Magistrate on the licensee being convicted of any offence—such conviction not being reversed on appeal or in revision—which in the opinion of the Magistrate renders him unfit to hold a license. Provided that any decision under this section by a Magistrate other than the District Magistrate shall be appealable to the District Magistrate, whose order shall be final.	No alteration.
CLAUSE 10. (1) <i>Books to be maintained.</i>—Every licensed gold dealer shall keep at his place of business a book (hereinafter called a gold dealer's register) in which the receipt or disposal of all unwrought gold shall be immediately entered in such form as may be prescribed by Government. (2) Every licensed goldsmith shall keep at his place of business a book (hereinafter called a goldsmith's register) in which the receipt or disposal of all gold, silver, gold or silver jewellery, unwrought gold or other gold stuff, received, treated, or disposed of by him shall be immediately entered in such form as may be prescribed by Government. (3) Every gold dealer's register and every goldsmith's register together with any article or items of gold referred to therein and in the possession of the licensee shall be open to inspection at any time by any police officer not below the rank of Chief Constable, or any police officer specially authorized in this behalf by the Superintendent of Police or by a First Class Magistrate; provided that the person making such inspection shall not divulge the result thereof to any person other than a police officer or Magistrate or by order of a court, under a penalty on conviction not exceeding one hundred rupees.	Every licensed <i>mica</i> dealer shall keep at his place of business a book (hereinafter called a <i>mica</i> dealer's register) in which the receipt or disposal of all <i>mica</i> shall be immediately entered in such form as may be prescribed by Government. Not applicable. Every <i>mica</i> dealer's register in the possession of the licensee shall be open to inspection at any time by any police officer not below the rank of Chief Constable, or any police officer specially authorized in this behalf by the Superintendent of Police or by a First Class Magistrate; provided that the person making such inspection shall not divulge the result thereof to any person other than a police officer or Magistrate or by order of a court, under a penalty on conviction not exceeding one hundred rupees.

MYSORE MINES REGULATION, 1906—*contd.*

<i>Clauses applicable to Gold in Mysore.</i>	<i>Clauses as amended applicable to Mica.</i>
CLAUSE 11. <i>Goldsmiths not to deal with gold, etc., until after three days' receipt.</i>—No licensed goldsmith shall smelt, work, use or deal with any of the articles directed to be entered in his register under section 10 until after the expiry of three clear days from the time when such article is received by him. Provided that this section shall not apply to the repairing of articles of jewellery by a goldsmith in any way which does not change or destroy the identity of such articles.	Not applicable.
CLAUSE 12. <i>Possession of unwrought gold unlawful except in certain cases.</i>—It shall not be lawful for any person to have in his possession any unwrought gold unless he holds a gold dealer's license or a goldsmith's license or unless he is a Mining Proprietor or duly accredited person acting on behalf of a Mining Proprietor.	It shall not be lawful for any person to have in his possession any mica unless he holds a mica dealer's license or unless he is a Mining Proprietor or duly accredited person on behalf of a Mining Proprietor.
CLAUSE 13. <i>Penalty for breach of section 5, 6, 7, 10, 11 or 12.</i>—Any person committing an offence under section 5, 6, 7, 10, 11 or 12 shall, except in the case mentioned in the proviso to sub-section (3) of section 10, be liable on conviction to fine not exceeding five hundred rupees, or imprisonment of either description for a term which may extend to one year, or both.	No alteration.
CLAUSE 14. <i>Substitution or addition of whipping in certain cases.</i>—It shall be in the discretion of the Magistrate, in the case of any person, not being a female or other person exempted under section 393 of the Code of Criminal Procedure, who shall be convicted of a second offence under section 5, 6, 7 or 12, to award whipping under the provisions of the Mysore Whipping Regulation V of 1903, either in substitution of, or in addition to, the penalty provided in section 13.	No alteration.
CLAUSE 15. <i>Power to search.</i>—Any police officer, not below the rank of an officer in charge of a police station, may search any person or any house, building or place for the discovery of any mining material, unwrought gold or other thing with, or in respect of, which an offence under this Regulation is reasonably suspected to have been committed.	Any police officer, not below the rank of an officer in charge of a police station, may search any person or any house, building or place for the discovery of any mining material, mica with, or in respect of, which an offence under this Regulation is reasonably suspected to have been committed.
CLAUSE 16. <i>Liability of tenant or occupier of premises in regard to unwrought gold or mining material seized therein.</i>—Any person being the tenant or occupier or reputed tenant or occupier of any premises, at the time when any unwrought gold or mining material reasonably suspected of being stolen or unlawfully obtained is found thereon and seized by any police officer, shall be deemed to have been in possession of such unwrought gold or mining material within the meaning of section 12 or 6, as the case may be, until he proves the contrary.	Any person being the tenant or occupier or reputed tenant or occupier of any premises, at the time when any mica or mining material reasonably suspected of being stolen or unlawfully obtained is found thereon and seized by any police officer, shall be deemed to have been in possession of such mica or mining material within the meaning of section 12 or 6, as the case may be, until he proves the contrary.
CLAUSE 17. <i>Liability of undesirable person to be ordered off any mine or cooly colony.</i>—The Superintendent of Police for the Kolar Gold Fields may, by order in writing, direct any person, whose residence within such area as may be notified by Government from time to time is considered undesirable, to quit the said area within twenty-four hours and such person shall not, after the lapse of the said time, remain at or re-enter the said area without the permission of the said Superintendent of Police.	The Superintendent of Police for the districts of Hazaribagh, Monghyr and Gaya and corresponding officials in Calcutta may, by order in writing, direct any person, whose residence within such area as may be notified by Government from time to time is considered undesirable, to quit the said area within twenty-four hours and such person shall not, after the lapse of the said time, remain at or re-enter the said area without the permission of the said Superintendent of Police and corresponding officials.

MYSORE MINES REGULATION, 1906.—concl.

Clauses applicable to Gold in Mysore.	Clauses as amended applicable to Mica.
CLAUSE 19. Penalty for breaches of section 17.—Any person committing any act prohibiting under section 17 shall be liable on conviction to fine not exceeding one hundred rupees or imprisonment of either, description for a term not exceeding three months or both.	No alteration.
CLAUSE 20. Cognizability of offences by the Police.—All offences under sections 5, 6, 7, 10, 11, 12, 16, 17 of this Regulation shall be cognizable by the police.	No alteration.

WITNESS No. 91.

E. Lane. MR. E. LANE, Mine Manager, the Chota Nagpur Mica Syndicate, Ltd., Kodarma, Huzaribagh District, Chota Nagpur.

WRITTEN EVIDENCE.

ing and
specting Rules
13), Mining
ses.

With reference to the clause in the new mining lease in the proposed model form of lease for mica in which a royalty of 5 per cent. *ad valorem* may be levied in lieu of a dead rental of Re. 1-8 per acre, I beg to state that the royalty system is quite unsuited to the mica industry and will simply lead to fraud. In fact it may be compared morally with the income tax and the personal tax in municipalities—because there is no possibility of checking the quantity or value of the lessee's output except at an impracticable expense on officials and great interference with the work of mining. It presents a great temptation to actual dishonesty and even to the most scrupulous lessees it presents practical difficulties in calculating values fairly between themselves and Government. To the extent that the dishonest evade payment it constitutes a trade preference in favour of the dishonest of a grossly unfair kind.

est Department.

Q. 105.—There is only one road leading through the Kodarma forest and it was made about 26 years ago. The other so-called roads through the forest are only rough tracks along which even the primitive sagar (village cart) can with difficulty travel. The main road is so ill-kept as to be practically useless for any wheeled traffic except bullock carts. The reason is that the Forest Department would not give enough money for the maintenance of the road. They have not made a new road in this forest as far as I am aware for over 20 years.

The present annual revenue accruing to the Forest Department from the mica mines is about Rs. 32,000. The total amount of money spent by them on the upkeep of the road and tracks in the forest is about Rs. 200 annually.

The want of proper communications throughout the forest is a very serious hindrance to the development of the industry. Roads are urgently wanted.

a thefts.

As the police seem unable to prevent these it is time the law relating to theft of mica was changed. At present a cooly may be caught carrying mica which he has stolen—in fact several instances have occurred in which the police have arrested coolies with stolen mica in their possession but as no one claimed the said mica, it being impossible to identify it, the culprits were released.

The law as it stands at present lays the onus of proof on the prosecution but in the case of mica it is, as I have stated above, impossible to identify mica.

What is wanted is that the Calcutta and Howrah law which insists that the onus of proof rests on the suspected person should be brought into force in the mining area.

ORAL EVIDENCE, 30TH NOVEMBER 1916.

President.—Q. You say that what is wanted is that the Calcutta and the Howrah law which insists that the onus of proof rests on the suspected person should be brought into force in the mining area. I do not quite understand the expression. I have not heard of the Calcutta and Howrah law. What is this?—A. There is a special police bye-law in force in Calcutta.

Q. The onus of proof is on the suspected person?—A. Yes, in Calcutta any person suspected of carrying stolen property may be stopped by the police. A Policeman told me this some time ago.

Q. In the case of gold mining and diamond mining the operations are limited to a small number of fairly large concerns and it is consequently easy to narrow the issue with regard

to the origin of either the gold or the diamonds. But in the case of mica mines I understand that there are so many small concerns that it is impossible to apply any law of the kind. The concerns are so small that anybody might be a mica thief in a small way?—A. Quite so.

Q. So that you cannot suggest any way by which this thieving can be prevented except by reversing what we regard as a very important principle of justice, that is, throwing the onus of proof on the suspected person. It will be a rather difficult thing to do?—A. I suppose so.

Q. Can you suggest any other way of avoiding this difficulty?—A. Every miner should have a license.

Q. License for what?—A. To prove he is entitled to carry the mica. Every workman should have a ticket with the name of his employer or company and his own number and the mine in which he is working on the ticket.

Q. What would prevent the man who is carrying a pass from handing it over to another friend who is not justified in carrying it?—A. The only way is to make the Sirdar of a gang of workmen responsible for his men's tickets and he should be made to deposit a substantial security.

Q. Would it be possible to limit the number of men who are authorised to carry mica in the open areas from the mine?—A. It would not be possible.

Q. Would it be possible to prevent mica being carried at night?—A. It would be difficult as the Kodarma forest has so many outlets.

Q. What I mean is would it inconvenience the honest industry if we prohibit the carrying of mica at night?—A. Yes, because in the hot weather the mines are often worked at night.

Q. You do not think this is practicable?—A. No; it is not practicable for the reason given above.

Q. Practically this thieving is done at night?—A. In the day too. But most of it takes place at night.

Q. The difficulty is to control it at night and you say that it would be inconvenient to have a Government regulation preventing the carrying of mica at night?—A. Yes, because of the reason already given.

Q. We want rules of such a kind that they will reduce the amount of thieving and at the same time not seriously interfere with the work of honest mining. What hours can you suggest?—A. Fixing of hours will make no difference. If a man wants to steal he will make opportunities. The remedy for the evil lies in giving heavier sentences for mica theft; at present the sentences given are ridiculously light.

Q. Can't you re-arrange the day so that you could get your coolies in by day-light?—A. We are dependent on a class of labourers who are cultivators and they attend to their fields in the mornings and go to the mines afterwards. So that the work has to be carried on till late in the afternoon.

Q. Cannot you have certain number of coolies who are registered and who could be provided with passes?—A. That ought to be done.

Q. I am asking you these questions because if you are making a complaint against mica thieving you must undertake to put up with a certain amount of inconvenience, that is to say, a certain amount of disturbance of your present habits if you are going to facilitate anything like Government regulations?—A. Quite so.

Q. What I want to obtain is something like practical suggestions. We have really none so far. We have seen a draft Act sent up to the Bihar and Orissa Government, but on local enquiries being made they found that a large number of mica mines are against the Act rather than in favour of it. In those circumstances it is very difficult for us to Act?—A. The Government should hold a conference with the leading mica firms and draw up legislation which is broadly suitable and reasonable and then insist on all the firms and lessees carrying it out.

Q. Do you think there are any mines which would not loyally carry out such regulations?—A. I cannot say that.

Q. Could we control the issue of the passes to men who carry mica at night? It would obviously be in the hands of the mining men themselves. Can they be trusted?—A. I believe people in the Kodarma mining area can be trusted but I know nothing about the zemindaries.

Q. That is where the difficulty comes in. Would it not be simpler to have a uniform order preventing the carrying of mica at night?—A. The legislation should apply to the entire mica field and industry without exceptions.

Q. It has been suggested that mica thieving can be largely stopped if we had a regulation of this kind, namely, the establishment of one or two receiving depôts in the district and an order that no mica was to leave the district except through these depôts?—A. Yes, this would be an excellent system if the official-in-charge of the receiving depôt was a trustworthy and capable man.

Q. A great deal of mica does not pay royalty at all coming out of zamindaries. Would it interfere with the trade as a whole if Government passed a regulation that no mica was to leave the district except through certain registered depôts?—A. It would not interfere with the trade and private persons owning properties should be reasonable and loyal enough to submit to the same legislation as their fellow-workers in Government fields.

Q. Are you a member of the Kodarma Mining Association?—A. Yes.

Q. Can your Association discuss that question and produce something like a practical scheme?—A. I shall place it before the Association.

Q. I have asked Mr. Cockburn* the same thing but I want to know from you whether there is any *prima facie* difficulty in the way. Is it worth while your considering it?—A. I think it is.

Mr. A. Chatterton.—Q. I cannot understand what is the difficulty. You have a mine working over a scattered and a considerable area and are not your coolies mining under supervision?—A. Yes, they are mining under the supervision of sirdars who were coolies themselves before they were promoted and are more or less in league with their coolies. This is the only supervision that it pays us to employ except in the case of a few of the larger mines.

Q. When they stop work they bring their mica in headloads to the godown?—A. Yes.

Q. And those godown are at a considerable distance?—A. Sometimes as far as seven miles.

Q. Do they get any bonus on results?—A. No. They do not.

Q. Most of the theft occurs between the mine and the godown?—A. Yes, but in many cases the mica is taken out of the mine at night by gangs of thieves who overawe the guards in charge.

Q. Is the mica weighed at all before it leaves the mine?—A. It is not weighed at the mine at all.

Q. How do you know that the mica is stolen or not?—A. By the disappearance of the crystals that were left showing in the mica reef at the close of the previous day's work.

Q. Is it practicable to work the mine in the dark?—A. No, not in the darkness but the thieves have lights.

Q. Do you not have subsidiary godowns near the mine?—A. In a few cases, but as a rule the godowns is some distance away from the forest for fear of forest fires often caused by the coolies cooking their food.

Q. Would it not be possible to have an iron safe which is not very bulky?—A. We could do that but we have got such a number of small mines that it would be very expensive to do this. Moreover the mica is stolen before it is taken to the godowns.

Q. You could use one godown for a radius of a mile round?—A. One godown has to receive the mica not from one mine only but from a group often several miles apart.

Mr. C. E. Low.—Q. Mr. Cockburn made a suggestion that Government mining engineers should be employed not only to carry out the present functions of the Mines Inspectors but also to compel and advise mine owners to work on sound lines. Do you consider that would be a good policy?—A. I do. I think it would be a very good policy if we had some professional men to give lectures once a week or once a fortnight to the managers* and assistant managers of the various concerns.

Q. I was not alluding to that sort of instruction. I was alluding to the idea of mining engineers coming round and enforcing the carrying out of operations in a particular way?—A. I think it would be a very good idea to be able to get advice from them. One wants advice at times.

Q. Should it be advice or order?—A. Advice.

Q. You would not like, for instance, a Government mining engineer coming round and saying that this is not the right way of working the mines?—A. I would rather get his advice than be under his orders.

Q. Do you think it would be a good thing to have the scope of these inspectors' duties extended in the matter of greater interference?—A. We do not want any interference. But we want advice, a man whom we can consult when we have a difficult piece of work on hand.

Q. Do you think that the ordinary consulting engineers would object to that sort of entry by Government into the field of advising?—A. They may object from the point of view of their private interests, but I don't see why they should dictate to Government in matters where the public interest is at stake.

Q. Would you have the Government mining engineer advising in individual cases or would you confine him to lecturing and general demonstration purposes?—A. Let him do both.

Mr. A. Chatterton.—Q. Is the mining done very extravagantly?—A. It has been done very extravagantly in the past. But we are getting more careful. We are having scientific mining now.

Q. Would it not be possible and justifiable if Government appointed an inspector to inspect the workings of the mines and to see that no wasteful methods were adopted?—A. We have an Inspector of Mines already. He comes and inspects the mines.

* Vide Additional Written Evidence of Mr. Cockburn, Witness No. 90, printed after his oral evidence.

Q. How often?—A. Sometimes two or three times in a year.

Q. He inspects the bigger mines?—A. He comes up and enquires into accidents whenever they occur and in the cold weather he comes on tour.

Q. Would it not be possible to introduce a better system of mining so as to secure a larger production and less waste. The methods adopted by the Indian miner are often wasteful and uneconomic. Would it be desirable if the owner of a license who is working in bad way, and with wastage were put to restrictions and made to work it in better ways?—A. That ought to be done.

President.—Q. You refer to the royalty system of 5 per cent. and the levy of a dead rental of Re. 1-8-0 per acre. Do you think that the new system is as good as the old one?—A. The new system of royalty is not satisfactory. It gives us much trouble. They give us countless forms to fill in and Government wants the returns of sales every six months which we cannot give as the mica is often not sold in London for a year or longer.

Q. I think you are talking of the old system under which you paid royalty at 5 per cent. on the local value?—Q. Yes.

Q. And now you pay Re. 1-8-0 an acre and no royalty. Surely this is the simpler system?—A. Yes, that is the method we want. In the new form of lease they want to do away with the dead rental and impose royalty.

Q. Is it correct that you now pay Rs. 1-8-0 an acre and is it not correct that some years ago you used to pay 5 per cent.?—A. Yes.

Q. Is not the system of dead rental satisfactory?—A. Yes.

Q. Why do you think the Government want to alter this?—A. Because they want more revenue from the mines they have sent a letter to the Association discussing about introducing the royalty system.

Q. When did they write?—A. In October 1916.

Q. Have the members of your Association complained of the system of charging Re. 1-8-0 an acre?—A. No.

Q. Have you any idea as to why Government are contemplating this change?—A. Because Government consider that they might obtain a higher revenue under the royalty.

Q. Why not raise the rent to Rs. 2 then?—A. I have proposed to raise it to Re. 1-12-0 to the Commissioner of the Division.

Q. Your Association would like to have an increase of the dead rental rather than a reversion to the system of royalty?—A. Yes. Because the royalty system entails incessant and vexatious examination of accounts which are generally carried out by subordinate officials.

Q. The Government have not indicated their intention to revert to the royalty system?—A. Yes. Government have indicated their intention of reverting to the royalty system if they are satisfied that it is necessary.

Q. Government may be enquiring into the working of the present system. Have they told you that it is their intention?—A. They say that unless we can prove that Government is not losing money by the transaction they shall revert to the royalty system.

Q. That is a different matter and your way of proving it is by offering the enhanced rate of Re. 1-12-0?—A. I believe Government officials find it difficult to obtain true returns from the majority of the mica firms and from private lessees.

Q. I do not think you need worry about it. The Government is obviously trying to find out whether after a certain number of years during which this system has been on trial they are losing money. That is a very fair enquiry?—A. Yes.

Q. If the Government finds that they are losing money you would no doubt be prepared to come up to the old standard of revenue?—A. Yes. But we want to avoid annoyance and interference. Minor officials come now and again and inspect the books.

Q. Do you think that the acreage system is working satisfactorily?—A. Yes.

Q. You are willing to submit to a readjustment of rates so that the Government may not lose. If the mica mining goes down the Government will suffer like you?—A. Yes.

WITNESS 92.

MR. HERBERT J. SPARKS, Consulting Engineer, F. F. Chrestien & Co., Ltd., Mica Mines, Mr. H. J. Spar
Domchanch, Bihar.

WRITTEN EVIDENCE.

The questions set forth for the guidance of witnesses are only applicable to the mica Mining industry in one or two instances. Where such questions are directly touched upon in this statement they are indicated by marginal references.

The war has rather suddenly revealed the importance of the mica industry, not only to particular localities of India but to the whole manufacturing world and the British Empire in particular, since mica is a prime necessity in the manufacture of electrical

apparatus of nearly every kind while the deposits that at present supply the world's demand lie, for the most part, within the confines of the British Empire and this country above all. It is these facts that have induced, as I understand, an inclination in the home authorities to regard mica mining and the subsidiary industry, the manufacture of micanite as "key industries" calling for special treatment.

While India is favoured by fortune in having at least two fields of considerable size and richness, in the Hazaribagh District of Bihar and Orissa and the Nellore District of Madras, it must be confessed that the value of these fields and the importance of their conservation have barely yet been appreciated so that a great waste of mineral wealth has already occurred. This waste can be directly attributed to the lack of system and method that characterised the mining business for so many years—and is still, I am afraid, its distinguishing hall mark—and the apathy of Government in allowing such a state of affairs to continue unchecked. Many a vein of yet potential value at depth, worked to the limit of profit with human material only, lies gutted and derelict with pillars cut and roof fallen in. To re-open such mines is a work demanding skill, capital, and time.

If superstition, prejudice, and rule of thumb are allowed to continue their destructive methods, then to my mind, it is only a question of time, and a limited time, before the mica deposits of Hazaribagh and Nellore will be entirely ruined (except for such portion of them as may be held by concerns who pursue methodical mining tactics) with the inevitable result that the leading position at present enjoyed by India would pass to other countries, and possibly outside the Empire. On the other hand, judicious control by Government in the future development of our mica-bearing fields should go far towards maintaining and improving India's position in the world's markets for an indefinite time.

No doubt there were economic excuses for the slipshod hand-to-mouth methods of mining adopted in the earlier days, but the cogency of those excuses, such as it was, is now passing away as surface deposits, with their supplies of cheap mica, become gradually exhausted and the need of deep mining becomes more and more insistent to find the mica called for by the market.

However favourable market conditions may be, and on such a subject it is impossible to prophesy, the transition from methods of reckless waste to methods exactly contrary is bound to be a period of difficulty.

Government can do much to tide the industry through this period, by judicious control and assistance. Having said the industry calls for control and assistance I now divide my statement into two parts and in the first I will endeavour to indicate how a measure of Government control can be made to prevent the premature destruction of deposits, while in the second I will try and show how Government can assist the enlightened and responsible miner.

Remarks applicable to the Hazaribagh District generally.

Part I.—Control.

1. *Mining Rules.*—These should be drafted on lines more applicable to mica mining than the present regulations and these rules should aim at the prevention of destructive mining methods and not *solely* at safeguarding the workman, though the latter is, of course, of great importance. The rules should be drafted in consultation with experienced miners having knowledge of local conditions. The rules should be made applicable to all mica mines and not only to such as are held under Government leases.

2. *Inspector of Mica Mines.*—Under the present scheme of inspection genuine control is almost *nil*. The mines are visited about once a year and as the inspector has seldom much time at his disposal his inspection is apt to be unduly confined to the larger concerns whose operations, really, least require inspection. The men chosen as Inspectors seem to be entirely colliery-trained engineers who necessarily lack the capacity to appreciate the requirements of reef mining. The man appointed as inspector of mica mines should be a qualified mining engineer, with sufficient experience in *vein* mining to allow of his giving advice useful to a mica miner. To secure this the man should be attached for a twelve month to some mica concern so that he could appreciate to some extent the special needs and the point of view of the inspected through the varying seasons of the Indian year. This inspector should be provided with the powers necessary to see that the rules applicable to mica mines were honoured in the observance as well as the breach.

3. *Plans of Mines.*—A rule at present exists calling on all mine-owners to keep accurate plans but owing to the backward condition of the industry it has not been enforced. In my opinion it is a rule that should be insisted on in mines of any appreciable size and possibilities, as reliable plans of the mine workings are of the greatest value in re-opening abandoned mines as well as of collective scientific value in conveying information as to the behaviour of the veins. Both a plan and a section showing correctly the area and depth of the workings should be kept to a standard scale and copies should be filed with the inspector whenever a mine is abandoned.

Part II.—Assistance.

At the best of times mica mining has been, and will continue to be, a hazardous enterprise. If to the ordinary risks is to be added the burden of the restrictions outlined above,

it will be necessary to afford assistance to the industry such as will encourage responsible parties to invest the capital and energy required to develop the industry on approved lines.

This assistance can take many forms :—the prolonged enjoyment afforded by long leases : supply of labour, skilled and unskilled : suppression of mica stealing : closer administration and improved communications : alteration of rules applying to Government forests and land-tenure : simplification of the terms of Government leases.

1. *Administration*.—Q. 110. Considerable assistance could be rendered to the industry in the District of Hazaribagh by bringing the mica fields into closer touch with its administrative and judicial machinery. Hazaribagh town, the District headquarters, is distant some fifty miles from Kodarma, while the sub-divisional town of Giridih is the same distance from the neighbouring field of Gawan. All cases have to go into these two towns for hearing, which, given the known penchant for delay and postponement in all Indian legal matters, is a cause of so great a waste of time and money as to amount to something like a denial of justice to miners in Kodarma and Gawan.

2. *Communications*.—Such feeder communications as there are in the mica area consist of roads. Of roads the lack is severely felt especially of a properly maintained District Board road to give secure and direct communication between the mines lying in what is known as the Kodarma field and those lying in what is known as the Gawan field. Such road communication as there is between these two fields is unnecessarily roundabout. In the matters, therefore, of administration and communications, I would suggest the desirability of treating the mica mining area as a magisterial centre, with headquarters at Kodarma, and the urgency, in any case, of knitting up the area with the necessary roads.

3. *Mica Stealing*.—This is the running sore of the mica industry and one that calls for prompt surgery if the business of *reputable* mica mining is not to expire altogether.

Illicit mica buying flourishes on a surprisingly large scale, mica being an article eminently saleable, of small bulk to conceal and practically unidentifiable.

The law of identification of stolen goods as it now stands and is applied is the palladium of mica stealing : persons having many times been caught red handed with mica to which they could have no possible right but, because the miner could not swear positively that the mica was his, prosecution has resulted in acquittal.

There are two parties to this illicit traffic ; the actual thief, who is generally a cooly, and the receiver, who is generally a mudi. The temptation to the cooly, is the fact that he can earn many times his daily wage by stealing mica and passing it to one or other of the receivers who pervade the whole district and ask no questions. The temptation to the receiver is the hope of gain coupled with the immunity afforded by the law of identification, an immunity enhanced if he is on the right side of the nearest policeman.

The only cure of this harassing and dangerous plague would appear to be the shifting of the *onus probandi* of the derivation of suspicious mica from complainant to defendant. Further, trading in mica should be permitted only under license from Government : this would probably reduce the obvious excess that now exists in the number of traders compared with actual miners.

4. *Skilled Labour*.—Q. 57. Skilled labour, as such is generally known in mining, does not exist in the Indian mica fields. The matter of some beginning of technical instruction is one I would urge on the notice of Government. As the mines are scattered over such a wide area it is difficult to suggest any means by which instruction in methods of mining can be conveyed to the overseers and mistries, etc., but possibly a scheme of simple lectures at various central points by the Inspector or other competent individual and the use of pamphlets and sketches would indicate a beginning. Technical education as it is applied in India appears to me to aim too high and to be of far too towering a nature for the foundation on which it is built. As mining is essentially a trade to be learnt only by practical experience, a form of apprenticeship would be a desirable avenue of instruction provided that any number of sufficiently educated youths could be found with enough force of character to face the existing conditions and to continue through the probationary stage. There would be undoubtedly ample scope for even partially trained men while a status could be given them by the institution of a simple examination for certificates as mica mine overseers.

5. *Unskilled Labour*.—This labour is drawn from the local inhabitants who are all petty cultivators with only a partial stake in the mining. The scanty and fitful attendance of this labour already constitutes a severe handicap. It does not seem possible to remove this handicap by a mere rise in the rates of pay, which tends rather to aggravate the malady, the cooly class being content, apparently, with a mere hand-to-mouth existence. The labour is inefficient and jealously conservative of old and wrong methods. I believe that emigration has been responsible for a diminution of such labour supply as there is, and I would urge, that emigration, and especially indentured emigration, should be discouraged.

Suggestions applicable to the Government Forest of Kodarma.

(a) *Roads*.—In the area of the Kodarma Forest it may be said no roads exist. There is one track from Kodarma to Debour, 10 miles long, which becomes almost impassable to wheeled traffic during the rains. There is another similar track roughly at right angles to this. Of feeder roads there are absolutely none. I understand that a sum of about Rs. 200

per annum is all that is allowed by the Forest Department, under whose control these tracks are placed for their upkeep.

(b) *Forest Preservation.*—Q. 105. Of the mines in the District of Hazaribagh of which Government is the landlord all, or nearly all, lie within the confines of the reserved Forest of Kodarma. This jungle tract covers what there is reason to believe is an exceedingly valuable mica belt. The undergrowth and rank grass of the forests must, presumably, still conceal a number of possible prospects.

I cannot claim any particular knowledge of forestry but the fact that the area consists largely of mica schist and pegmatite outcropping with a very thin covering of soil (where any exists) would seem to suggest that really big or valuable timber can never be grown. There are, however, a good number of sal trees of suitable size for mine props, and other timber essential to the miner; and, under Forest regulations, it is now impossible to obtain these as and when required. Other regulations prevent the centralisation of mine labour on the mines, a matter of increasing importance.

Nellore District.—The body of my statement is applicable to the Nellore District. The mica occurrences in this district differ considerably in their nature from those of Hazaribagh. In place of a rugged jungle surface with many exposed outcrops there is a flat plain very largely covered with a layer of laterite and more recent alluvium. A consequence of this formation is that prospecting has not been so widespread and that successful exploitation has been restricted to a comparatively small number of big mines. This is, in my opinion, the principal reason why mica stealing is not so much in evidence though the comparative immunity of the miner may also be due to the comparative honesty of the labouring element. Since, however, the penchant for theft now noticeable in the Hazaribagh field was not an indigenous growth but was introduced by traders, I consider that it would be advisable to make such regulations as may be beneficial in fighting the evil of general application as safeguarding the future from sporadic tendencies.

Communication.—The roads in the Nellore District call for urgent attention. The major portion of the mining area is enclosed in a triangle of which three local fund roads form the sides. Two of these roads are intersected by rivers which are an obstacle to traffic at all times and periodically impassable in the monsoon season. The interior of the triangle has no publicly maintained roads of any sort. A good road is badly needed and could easily be provided to connect one corner of the triangle at Podalakur with the centre of the base near Sydapuram, a distance of about eleven miles, of which three to the Criminal Settlement at Kalichedu are already made. I understand that the necessary bridges were designed and sanctioned but the building was postponed indefinitely. I would urge that construction should be immediately proceeded with.

Forest.—There is an entire absence of all timber suitable for mine props in the Forest reserves within reach of the mining district. There is however a good deal of reserve consisting of stunted scrub and cactus which yields a certain amount of fire wood averaging perhaps from 3 to 5 tons per acre. Coupes are sold annually by auction but are generally bought by contractors for supplying the Madras market. These contractors form a ring and will not bid against each other but force up the price against the miner. As the district is at a great distance from any coalfield the question of fuel is a serious one and I would suggest that coupes within five miles of any mine be reserved for miners at a small royalty per ton of fuel yielded per coupe.

Regulations.—The need for special rules for mica mines is felt as much in Nellore as elsewhere; if anything, owing to the lack of timber, destructive methods have gone to even greater lengths than in the Hazaribagh District. The system of tenure is different in that royalties are paid instead of rent and the scale of royalties contains some anomalies which need correcting. The system is not one which commends itself to the miner as it involves considerably more decentralisation and the maintenance of otherwise unnecessary staff.

ORAL EVIDENCE, 30TH NOVEMBER, 1916.

President.—Q. What experience have you had of mica mining before coming to India?
—A. None. I was on gold-mining before.

Q. What is your professional training?—A. I received my training in the Camborne School of Mines. I am an Associate of the Institution of Mining Metallurgy.

Q. And you have the Camborne diploma?—A. Yes, of the first class.

Q. Where were you gold-mining?—A. In Southern Rhodesia.

Q. Are you now controlling, as Chief Mining Engineer, the mines belonging to Chrestien & Co.?—A. Yes.

Q. You have had three years experience of this?—A. Yes.

Q. You suggest that the Mining Rules should be drafted on lines more applicable to mica mining. By "mining rules" do you mean the rules for the granting of licenses and leases, or are you referring to something else?—A. The actual rules which govern the working of the mines under the Mines Act.

Q. You want some kind of rules by which the mines inspectors could insist, not only on working the mines with due regard to their safety, but also with reference to the proper exploitation of their natural resources?—A. Yes.

Q. Do you think that rules of that kind would be practicable and could be worked?—
A. Yes.

Q. Are there many occasions on which an inspector would find it very difficult to say to a mine owner, "You are not working this mine in a way that will conserve the natural resources of the ground"? It would be easy for him to say that, but would it be easy for him to say that with due regard to the miner's object to get sufficient profit?—A. That is another matter.

Q. That is the whole matter, because the miner works for the purpose of making profit?
—A. Quite so, but such inspectors as I suggest could put a stop to much of the unnecessary waste going on. Under the present regulations they do make recommendations which are generally ignored, they have no powers to enforce them.

Q. But won't a general improvement come about as you get a better class of manager?
—A. For our own sakes we are quite contented to go on as we are. It is a recommendation from the Imperial point of view for preserving the asset which does exist in the mica views.

Q. The principle so far observed is that Government do not interfere with the methods a man adopts in mining with regard to the mineral resources, because it is so very difficult to define what is practicable in regard to the miner's chief aim. Everybody however recognises the fact that if you have a good mine manager, he will work on most economical lines. I understand that at present there are a large number of small concerns in the mica mining district, and these concerns are so small that they cannot afford to employ fully qualified mine managers, and that probably is the root of the whole trouble?—A. Yes, I think it is largely so.

Q. Is there any way by which the smaller concerns can be forced into amalgamation with the larger concerns, and forced equitably?—A. I think such a state of things will come about in time of its own accord, that these small concerns will have spoiled their mines in a very short time. They will have to give them up and only the larger concerns can tackle them.

Q. That will work out automatically after mining reaches a certain depth?—A. It is not a very economical way of working it.

Q. If you kill off the small man you kill off the small prospector. Mica occurs in a large number of small occurrences, and you will have a large number of men thrown out of employment?—A. I do not agree that killing off the small miner means killing off the prospector. No men would be thrown out of employment. We allow prospectors to go and work our squares under slight supervision to a certain depth. There it gets beyond his abilities and we take it over ourselves.

Q. You say that the Mining and Prospecting Rules "should be drafted in consultation with experienced miners, having knowledge of local conditions. The rules should be made applicable to all mines and not only to such as are held under Government leases"?—A. I do not refer to the granting of leases; that was a reference to the Mines Act.

Q. Then you have no grumble against the rules for the granting of Mining and Prospecting Licences?—A. Personally we have none.

Q. What criticisms have you to make with regard to the present rules being worked under the Mines Act of 1901?—A. As a matter of fact they do not affect us very greatly at present, because they are not very strictly enforced. There are a great many rules allowed to be a dead-letter, but if they were enforced, they would in some cases bear hard on the miner and do not apply to mica mining as they do to other forms of mining.

Q. Are you in favour of the Government insisting on the keeping of accurate plans, and that this rule should be enforced?—A. Mines of any considerable size should keep plans. The main thing is to have records kept, so that if it is necessary in future to re-open an old mine, one knows where one is.

Q. When you say that "the men chosen as inspectors seem to be entirely colliery-trained engineers who necessarily lack the capacity to appreciate the requirements of reef mining and the man appointed as Inspector of Mica Mines should be a qualified mining engineer", do you think that the industry is sufficiently important to justify Government keeping special inspector for the mica mining area of Bihar?—A. I certainly think the industry requires nursing in that direction. The man should be an adviser as well as an inspector.

Q. In regard to mica thieving, the suggestions that have been made so far are of a kind that you know of, being borrowed from South Africa and relating to the thefts of gold and diamonds; but aren't the conditions so different that there might be considerable hardship in departing from recognised British law by throwing the burden of proof on to the man who has been accused?—A. I certainly think there would not be any hardship if you had traders trading under a license. If all the mica that is purchased is purchased under a challan, there should be no difficulty. We are perfectly willing to come under such a rule.

Q. That is all very fine in the case of large miners, but the larger number of small miners are difficult to deal with. Take the case of a man who has a mica mine out in the forest, and the mica is sent a distance of 3 to 6 miles to a godown. What is to prevent a cooly dropping a sheet of mica on the way and picking it up the next day?—A. Nothing whatever. That is what we want to stop. Do away with the receiver, since we cannot get the thief.

Q. Is it practicable to establish in the district two or three receiving depôts which would be in effect Customs Houses, making it illegal for any mica to leave the district except through those channels?—A. I think it would be very effective.

Q. Are you a member of the Kodarma Association?—A. I am not, but the firm, whom I represent, is.

Q. This question has been referred by us to the Mica Mining Association at Kodarma, with the view of their discussing it and putting up some scheme that would work. Will you consider the matter and discuss it with your Association? That is one suggestion put before us as a means of avoiding legislation, which, obviously, would be a difficult thing to introduce. You recognise the difficulty of reversing our ordinary canons of law, except for a very violent disease. Are there any other ways in which it could be done; would it be possible to limit the number of men who are allowed to carry mica under any circumstances by granting a pass to a certain cooly or a certain person to carry mica?—A. That point has already been discussed by the Association, and they thought it would be a cumbrous machine.

Q. Do you think it would be practicable to stop all carriage of mica at night?—A. I don't think so. The distances are rather great from the mines to the central factories and godowns, and the coolies don't arrive at the mines until 10 or 11 o'clock in the day, owing to the fact that they come from various parts of the jungle, so that they don't generally leave work until dark, when they carry the mica home.

Q. No system of organisation could be adopted by which mica could be stored locally, so that transport would only take place in daylight?—A. Yes, I think it would be feasible, if one had very strong rooms put up in each mine.

Q. Do you think that if the transport of mica at night can be stopped absolutely, or if it could be controlled in any way, that would reduce effectively the amount of mica stolen?—A. I would qualify the word "effectively"; it would reduce it no doubt. Not only in transport is the mica stolen, but right at the working face, from the mouth of the mine, and even from your very godown. It is not so much the thief we are aiming at, but the receiver.

Q. So that some system of control depôts would be the most suitable?—A. I think that is probably the best suggestion.

Q. Do you know the Nellore district?—A. Yes.

Q. Are you responsible for any operations there?—A. Yes, we have two or three mines.

Q. There is less mica thieving there?—A. There is certainly less thieving; there are practically no traders there.

Q. Because the concerns are larger?—A. Yes, they are more centralised.

Q. Have you not suggested the introduction of villages in the forest reserve at Kodarma?—A. We have been discussing it ourselves, as to whether we could make settlements near the mines.

Q. The price of timber for mining purposes would go up?—A. We get very little from the Kodarma forests; our own mining timber is drawn from outside.

Q. You think that the reserve is of less value to Government as a forest than from the point of view of mining mica?—A. It certainly interferes with it a lot.

Mr. C. E. Low.—Q. Is the continued existence of the forest there necessary to the industry?—A. No.

Q. I mean for other reasons than the provision of mining timber?—A. No, we shall be glad to get the timber if the forest is cut down, as it is very difficult to get any timber from the forest and we have to send right down to Kodarma.

Q. Therefore it would not seriously injure the industry if the forest disappeared?—A. No, it would do us a great deal of good.

Q. Do you know if it is necessary at all to any of the surrounding villages?—A. They get a certain amount of grazing out of it, and are allowed to cut bamboos out of it. You won't find villages situated close to any mines.

Q. Turning to the question of transport, you complain of the condition of the forest roads?—Yes.

Q. Is your transport a light railway proposition or a road proposition?—A. A road proposition.

Q. How far are you from the nearest railway?—A. Kodarma town is 7 miles, i.e., the edge of the jungle stretches from there. Kodarma forest is only a small proportion of the mica area.

Q. But the quantity of stuff you move to and from any particular area is not large enough to warrant a light railway in that country?—A. The stuff we move from the mines would not be, but we are getting in material constantly. We are at present importing a good deal of coal and one thing or another.

Q. You quite recognise that it is not the function of the Forest Department to make roads for anything except for the extraction of their own produce, nor are the Forest Department particularly skilled road-making engineers. You would presumably prefer the road to be made by the ordinary organisation for doing so?—A. Yes, either the Public Works Department or the Local Board.

Q. Would the industry be prepared to make any special contribution to such a road?—
A. I think so. I think we should be prepared; in fact we have done a good deal to roads ourselves at times.

Hon'ble Pandit M. M. Malaviya.—Q. Your say that "the man appointed as inspector of mica mines should be a qualified mining engineer, with sufficient experience in *vein* mining to allow of his giving advice useful to a *mica* miner." At present, so far as you are aware, none of the inspectors so appointed has had any special training in mines?—A. They are all mining engineers but *colliery* mining engineers, which is an entirely separate branch.

Q. You want qualified mining engineers who can deal with mica?—A. A mining engineer is generally understood to apply to metalliferous mining. Mica mining is *vein* mining, i.e., similar to metal mining.

Q. Among the men who are employed in your mines, are there many who have received any technical instruction?—A. No, none.

Q. You received your education in some School of Mining?—A. Yes, the Camborne.

Q. There is no such school in this country as far as you know?—A. I think not.

Q. Do you think that the establishment of such a school would supply you with men qualified to take up the work of inspecting areas?—A. I don't think the establishment of a School of Mines would be quite feasible. I think they teach a certain amount of mining engineering in Sibpur, and some form of instruction on the coal fields, but I don't think that the people of the country are quite ready for a School of Mines. You want to start with something elementary.

Q. Supposing you had a student who had received his education in a School of Mining, do you think that there would be employment found for him in the mines?—A. Undoubtedly; we are most anxious to get men with some slight technical knowledge even.

Q. You say that you would like the mica mining area treated as a magisterial centre?—
A. Yes, we now have to take our cases to Hazaribagh town which is 50 miles from Kodarma.

Q. You want the sub-divisional officer to remove his headquarters there?—A. Yes, or another similar official stationed at Kodarma.

Q. Do you think there would be a sufficient number of cases to justify the establishment of such headquarters; are there a sufficient number of cases?—A. I cannot tell you.

Q. Are there many cases which have to be sent from Kodarma?—A. I cannot say whether the number is large but it would certainly be a good deal larger if cases were dealt with at Kodarma as prosecutions are now extremely troublesome.

Q. Since when have you noticed this difficulty of labour not being obtained?—A. In my time there has always been a shortage of labour, but in the last year or two I think the numbers have diminished. There are not so many mines actually working now as there were a couple of years ago, but we have rather more difficulty in obtaining labour now than we had then.

Q. What reasons have you to think that emigration has been responsible for it; are many people taken from the area around you for emigration?—A. Yes. I think it is a place to which recruiting people come very largely. I know that 500 or so were taken to Tavoy about twelve months ago.

Q. Are they also taken to other parts of the world?—A. They disappear; I cannot say where they go to. There is a good deal of snatching going on from one concern to another.

Q. Is this recruiting for emigration going on all the year round?—A. No, I don't think so, not very much at present.

Hon'ble Sir F. H. Stewart.—Q. Would you give executive powers as well to the inspector of mines?—A. I should give him both.

Q. So that if he found a mine being worked on very bad principles he could say to the mine owner, "You must remedy this at once or I shall stop your works"?—A. Yes.

Q. Would not that lead to a great deal of friction?—A. You require a man who has a good deal of discretion. I don't think it is unworkable.

Q. He would have to be a free agent and should be the ultimate authority, and there should be no appeal beyond him?—A. I do not think there would often be any question of appeal, at present what Government are doing in effect is to say to the square holders "you must work a certain proportion of your squares, we don't care how you go about it, you can ruin the deposits as long as you don't kill any one." My experience in Rhodesia was that there officials had separate districts. They had inspectors with considerable powers and also an engineer in an advisory capacity to pay periodical visits to anyone wanting him on payment of a nominal fee, a very useful man indeed.

WITNESS No. 93.

MR. E. S. TARTON, A.M.I.M.E., Chief Engineer, Kumardhubi Engineering Works, Limited, Mr. E. S. Tarton.
and Collieries controlled by Messrs. Bird & Co.

WRITTEN EVIDENCE.

Q. 45.—To improve the labourer's efficiency and skill, first of all give attention to his Training of labour. surroundings by seeing that healthy and suitable housing accommodation is provided; (2) by

explaining how epidemics are caused; (3) by inducing men to spend more on suitable clothes and less on intoxicating drink. The labourers must be trained to become ambitious and the education that is offered must tend to cover these points. Certain proportions of the higher educated classes should be persuaded to leave law and medicine for a more practical life.

I have noticed in the engineering works with which I am connected, that very seldom do you obtain any sense from either the young or old before they have spent at least 18 months or two years in the shops. This is accounted for by the individuals not having received any elementary education. We have an elementary school for the work people, but it is very badly attended. My opinion is that the remedy lies in some form of compulsory education suitable for the industry of the particular district.

I find the higher the rate of pay the less attendances the workmen make, and until we are in a position to educate the workmen to a higher standard of living, an increase of wages will not improve the standard of Indian manufacturers or will India be able to produce an article equal to that manufactured in the West.

Training of supervision.

Q. 51.—For Europeans born in this country, education should be made compulsory from the age of 7. If the children are of poor parentage, the cost of their education should be borne by Government up to the age of 15. After this age the boy should be consulted and with the aid of his master his future career arranged for. If it is decided he enters the engineering profession he should serve five years' strict apprenticeship as the boys do at home. The firm by whom he is engaged should allow him time to take full advantage of any technical school there is in the district.

This particular district is not provided with a technical school, but I do think it is sufficiently developed to have its own college for the technical training of the engineering and mining student.

There are evening classes for mining students held in the district. As far as I am aware, they are not well attended but should be continued until such time better facilities are arranged.

The mechanical side of this particular branch of engineering is almost entirely neglected, and with the advent of the latest type of machinery something should be immediately done to provide the necessary technical training.

To help forward these classes special demonstration should be opened in local workshops until such time as technical schools are opened where instructions by British instructors could be given.

Study of foreign methods.

Q. 77.—I think Government should assist engineers of this country to study the latest practices in engineering in the West. At the present time a man on six months' leave has only time to take a glancing view of what is going on in the well equipped factories and shops in Europe, whereas, if Government drew up schedules of what could be seen and studied, an engineer may apply for three months' study leave every three or four years to study some particular branch of engineering which would apply to his particular department in India.

Railways.

Qs. 97 & 99.—There are many collieries in the Jherria and Raniganj coal fields, where properties are badly cut up by sidings. The coal underlying these sidings must be maintained for the purpose of supporting the approach and approaches to wharfs that are loading, perhaps on an average, 100 tons of coal per day. Not only does this coal lie untouched, but it often interferes with the lay-out of the underground workings, and other coal is lost and the cost of production in the particular area increased by haulages not laid out to the best advantage.

This wastage can be overcome by loading at a central point, i.e., coal from each pit may be delivered to a central loading point by aerial ropeway.

This system of transport not only grants the collieries full use of their properties for extraction of coal, but it provides part of a scheme for using the minimum of railway rolling stocks and liberates a large percentage of the surface labour for the production of coal.

I will try and explain how the railway can be assisted and how labour is liberated for production purposes.

For demonstration purpose I am taking one of a number of collieries raising 600 tons of steam coal per 24 hours—the quantity is raised from four pits :—

(1) The coal would be carried from the pits by an aerial ropeway to a large bunker, 1,200 tons capacity (I have taken this size bunker because the carrying capacity is sufficient for a rake of waggons). To expedite loading the bunker is fitted with suitable (shutes) for loading any type of waggon. The time taken for loading would be from 15 to 20 minutes.

To handle 600 tons of coal under present methods it is necessary to split up 30 waggons, or the quantity required for 600 tons, into four sidings, which alone takes more time than 60 waggons would to load if loaded from a bunker.

(2) It takes four persons a day to load one waggon or 120 to deal with 30 waggons. By aerial ropeway, 5 men would be in attendance at the loading end, 3 men at each pit for loading the ropeway buckets, making a total of 17 men. To this I will allow a further margin of 10 men.

The summary of this suggestion is—

(a) No coal is locked up for supporting sidings to pits.

(b) Time taken for loading 30 waggons or 600 tons is reduced from 20 to 2½—3 hours.

(c) The waggons are centralised, which allows the pilot to immediately make up his train.

(d) 77·5 per cent. of the surface loading labour is released for coal cutting in the mines.

At the oral examination, if I have the honour to be called, I shall be pleased to produce plans in order to make clear any doubtful point.

ORAL EVIDENCE, 30TH NOVEMBER, 1916.

President.—*Q.* Will you please give us an idea of the length and kind of experience which you have had in coalfields?—*A.* I have had ten years experience in the Indian coalfields. My experience is limited to Ranigunj and Jherria coalfields.

Q. And you have had an opportunity of taking a special interest in engineering questions?—*A.* Yes, I am the Chief Engineer for the collieries controlled by Messrs. Bird & Co. and Kumardhudi Engineering Works. We employ approximately two thousand men in the workshop and our output of coal is $\frac{1}{15}$ th of the total output of the Indian coalfields.

Q. Are the Engineering Works engaged chiefly on repairs?—*A.* We are constructional engineers, also engine builders. At present we are engaged on building electrical winders and haulages. The electrical parts come from home and the mechanical parts are made in our workshop. We buy steel from Messrs. Tatas.

Q. Have you been depending on Tata's steel for a long time?—*A.* No, for the past two years only. We are now entirely dependent upon Tatas for R. S. Joists. Large bars still come out from home, also steel cut gears, there are no such gears made in this country.

Q. There are some parts that you cannot make even if you are provided with steel and iron?—*A.* Not as regards steam engines. We cannot make internal combustion engines.

Q. Are you also interested in the Pottery Works associated with the Engineering Works?—*A.* I am Chief Engineer for the Pottery Works. I have no experience in silica and refractory other material. We manufacture silica, chromite, magnesite and fireclay bricks. As far as I am aware the material gives satisfaction.

Q. Is there a fairly big output of those classes of bricks?—*A.* The output is not great, but we are doubling the plant. Machinery for increasing the manufacture of silica bricks is on its way out from home.

Q. Have you in contemplation some system in which you would train young apprentices in connection with your work?—*A.* Yes.

Q. Is that scheme put into operation?—*A.* Are you now referring to the coolie labour?

Q. The training of young apprentices?—*A.* At the Engineering Works we are building a home for 16 boys. Eight of these will receive a mechanical engineer's training, the balance of students will be trained at the collieries as mining engineers and sent to the Engineering Works to gain experience in mechanical gears applied to mining.

Q. What is the length of the course?—*A.* Five years.

Q. Four years at the mines and one year at the Engineering Works?—*A.* Those who intend to become mechanical engineers will spend the whole of the time at the Engineering Works.

Q. Where do they get theoretical training?—*A.* Lectures will be given at the Engineering Works and at the collieries. At present there are evening classes for mining students held in the Jherria and Ranigunj coalfields.

Q. There are four or five centres for evening classes for mining?—*A.* Yes, Jherria, Dishergarh and Sijua. I am not quite sure about Ranigunj.

Q. You know of these evening classes?—*A.* Yes.

Q. And you think they have been satisfactory in the past?—*A.* I do not think they are well attended.

Q. They were attended at the beginning fairly well?—*A.* The students always fall away towards the end of the course.

Q. We shall presumably get the figures with regard to the attendance during the last ten years. Do you think they have done good work on the coalfields?—*A.* Yes, and I think they should be extended.

Q. Would you prefer the young men trained in that way, or would you prefer to send them to Sibpur or some such college?—*A.* I very much favour a college in the coalfield.

Q. Would you send the men for full day training?—*A.* My idea is boys should be taken on as apprentices and allowed time for technical study.

Q. What time, a week or month?—*A.* I suggest that half a day be spent at the mine for six days of the week and four half days at the technical college.

Q. How do you get over the difficulty of distance?—*A.* If a college is built either in Dhanbaid or Asansol it will be convenient for them to get there by train.

Q. How long will you take, for instance, to go from Ranigunj to Dhanbaid?—*A.* A train leaving Ranigunj at 12-30 would arrive at Dhanbaid about 2-30. A train leaving again in the evening at about 7 would be back again at about 9 o'clock.

Q. That is going to be pretty heavy tax on the students?—A. I do not think there are many students living at Ranigunj.

Q. When your mines extend into Goalpura, how will the students arrange?—A. They will have to come in for two or three days at a time.

Q. Why do you not begin with the system that you know will last longer and arrange for these men to go to the mines either for a certain number of days in the week or a certain number of weeks in the month, or a certain number of months in the year?—A. I do not see any reason against it, but I should have thought had the students been sufficiently energetic they would find ways and means of attending.

Q. No matter how energetic a man is, he is not going to sacrifice four hours a day in the train and call that time well spent?—A. After all, Dhanbaid is only a few miles from the Jherria coalfield. This is where most of the students come from.

Q. What is your opinion on the question there should be a certain number of half days?—A. A certain number of days would possibly make it much more convenient for the students.

Q. It is not merely a question of convenience. Do you think that the educational effect would be just as good as if the man spent one or two days or a week in the college and the rest of the time in the mine?—A. I think quite as good.

Q. Have you any objection on the score of principle to extending the principle further and allowing the men to spend six months at the school and six months at the colliery?—A. I see no reason why they should not, but I think it will be better for the student to receive practical and technical training together by attending college for half the week and the remainder at the mine.

Q. When do you hope to get the whole scheme into operation?—A. In a few months.

Q. You are going to provide them with a home to live?—A. Yes.

Q. And there should be some one to look after the home?—A. We have already started one home in the coalfield and there are four boys attending with a matron in charge.

Q. What class of boys?—A. Boys recommended from schools in Calcutta, Europeans, Eurasians or Indians. Boys will be taken on the recommendation of the Head master.

Q. Does caste prejudice interfere in any way?—A. We shall try and arrange for boys of one denomination to be put together.

Q. You have had a good deal of experience in constructing ropeways?—A. A fair experience.

Q. To what extent could you construct ropeways? Can you give us an idea of mileage?—A. Ropeways are built in section, single rope system 4 to 5 miles between stations. Double system $1\frac{1}{2}$ to 2 miles for rail cable tension and 4 to 5 miles hauling rope.

Q. Are there large spans?—A. We have a span of 1,500 feet. There are single cable spans of 4,500 feet. Double cable 7,200 feet.

Q. How is the cost of a span compared with constructing a siding in the coalfield?—A. In the case of Saltore, we bored the river and found sand to a depth of 132 feet. No company would undertake to bridge a river of 1,500 feet span and lay a railway track for 70–80,000 tons of coal per annum. By erecting this ropeway we overcome natural barriers which would have made any other method of transport impossible from a commercial point of view. Another instance is where we erected a ropeway, $2\frac{1}{2}$ miles in length, at a cost of Rs. 10,000 more than the estimate for siding. In doing this we did not lock up any coal and saved three annas per ton on coal passed over this $2\frac{1}{2}$ miles section after allowing one anna per ton for aerial transport.

Q. What difficulties are there about carrying out your ropeways? What about local rights and surface rights? Are you interfered in any way?—A. In the case last referred to, we had trouble with the people who held the surface rights, they asked ridiculous rates for the small plots we wished to take up for trestle foundations. We were able to remove the alignment to another property.

Q. The mobility of the rope gives you some advantage?—A. Yes, and the ground required for the erection of a ropeway is very small.

Q. What about crossing a public thoroughfare?—A. We have to bridge underneath the rope.

Q. Any difficulty about getting their sanction?—A. We are compelled to put up a protection bridge.

Q. In the first instance are you allowed to put in a wire ropeway without the sanction of the District Board?—A. We have had no trouble so far.

Q. In that way you get coal on to the railway at a convenient point?—A. The practice we have adopted for removing coal from the mine to the railway is by arranging the brickwork of the heapstead to form part of the bunker from which the ropeway buckets are fed. By this method waggons are mechanically loaded.

Q. So far, this work is entirely your own private arrangement?—A. Yes, but we are constructing three ropeways for other concerns.

Q. And is it your idea that this system should become general and some system of co-operation or systematic arrangement should be made by which everybody can take part?—

A. It is worth consideration. At one of our collieries we have 2½ million tons of coal locked up under railway sidings. In this particular case the railway passes over the property with five spurs to feed other collieries, the loss, due to these sidings, is very considerable.

Q. Is there any opportunity of economic sand filling?—*A.* I think that will and must come.

Mr. C. E. Low.—Q. What is the difference between the carrying power of a ropeway and of a siding?—*A.* An aerial ropeway should be designed to deal with the maximum quantity of material to be transported through a limited time and the capacity can be anything up to 300 tons per hour. The capacity of a siding if a single line depends on its length and the grades and the type of locomotive used, but in practice it is usually the loading arrangements which do not permit sidings being used to their maximum carrying capacity.

Q. I am not talking about the general economy of the use of waggons. Take your Saltore ropeway.—*A.* Saltore line is designed to carry 350 tons in 10 hours, this quantity removes the output of this particular mine, but this amount can be doubled by working the ropeway 20 hours if necessary. In some cases ropeways are designed to carry 300 tons of coal per hour.

Q. The design of your ropeway installation admits of great flexibility?—*A.* Yes. We design a ropeway to carry a certain tonnage.

Q. Owing to the number of sidings there has been a great difficulty in the matter of the locking up of coal?—*A.* Yes. Ropeways would minimise this.

Q. Does the carriage of coal by ropeways entail any greater damage to coal than the handling by sidings?—*A.* No. I consider very much less.

Q. Do you contemplate any definite arrangement about the co-operative working of ropeways by collieries?—*A.* No, not for loading coal. Yes, in the case of conveying sand from the Damuda river for sand packing for a group of collieries in the Sijua division.

President.—Q. How are you going to turn this into practical working on a large scale? Do you want us to make proposals, or are you prepared to co-operate yourselves?—*A.* I will make a proposal showing how railways and coal companies can be assisted. For instance, in the case of rolling stock, the saving of permanent track, a reduction in surface labour, and, last but not least, extracting coal which at the present time is locked up in the shape of million of tons supporting the necessary colliery sidings. If by collieries having one central loading dépôt, instead of five or six which is the usual case, coal can be taken by ropeway and loaded direct into waggons according to the quantities raised at that particular colliery, it matters not whether the colliery is raising a few hundred or a few thousand tons per day, the quantities can be dealt with at the dépôt in a few hours. This concentration of loading cancels the hours spent by the pilot engine running about the colliery yard placing a few waggons in this and that siding; it permits of the engine coming in with an empty rake and drawing out the loaded one in the space of a very short time. In my written evidence I gave the time taken for loading waggons and the time saved. It is therefore necessary for the railway and coal company to co-operate.

Q. How are you going to co-operate? Do you want any legislation or pressure?—*A.* I think if the railway companies insist on loading at a central point and graded their siding to deal with the increased traffic, colliery people would look round for the best method of placing the coal at this particular point. Several of our collieries have adopted this system and found it most successful. At the present time we are constructing three lines for other companies, allowing for loading at one dépôt.

Mr. C. E. Low.—Q. Supposing there is a Board of Arbitration to decide as to what is to be done in case of coal locked up at the sidings, do you think that such a Board could exercise any useful or fair pressure in the direction of inducing people to put up ropeways?—*A.* Such a Board should be given powers to liberate the coal either by sand stowing or ropeways.

President.—Q. Your idea is that the pressure should come from the railway company?—*A.* Yes.

Q. Your firm is interested in this financially?—*A.* We put in the Saltore ropeway and found it a great success, therefore at points where we found loading difficulties and large quantities of coal likely to be locked up by sidings we installed ropeways, several other people have realised this fact.

Q. More than that, you are the actual constructing company?—*A.* There are other companies building ropeways. It is open competition.

Q. You have nothing in the way of monopoly?—*A.* No. All steel castings come from home which places home manufacturers on equal terms.

Q. Is there anything connected with ropeways that cannot be made in this country?—*A.* Steel castings.

Q. What about the rope itself?—*A.* Yes.

Q. Do you know enough of rope manufacture to give us an idea whether steel ropes can be made in this country?—*A.* No.

Q. You are pushing this idea now without any intention of securing any monopoly of the business?—*A.* We have no intention of trying to create a monopoly. Ropeways can easily be built. We could not, in any case, create any monopoly.

Q. And then two or three systems might co-operate quite easily?—A. Yes. Some people build in the mono-cable system and some in the bi-cable. Both can be easily applied.

Hon'ble Pandit M. M. Malaviya.—Q. The Pottery Works are in the same property?—A. Yes.

Q. What is the number of persons you employ at the Engineering Works?—A. Two thousand.

Q. In the Pottery Works?—A. Four to five hundred. The Pottery Works have been in existence for nearly six years and the Engineering Works for about six years.

Q. You have felt the need of having trained engineers in your Works?—A. Yes.

Q. You propose to start your apprentice class, mainly because there is no such technical college as you propose should be established?—A. Yes.

Q. But suppose a school of mines is established at Dhanbaid would you even then start your classes?—A. I should certainly go on because I do not think the mining college would be sufficiently advanced for several years to be able to sufficiently train mechanical and electrical engineers.

Q. What is the financial aspect of this proposal? Will you charge a fee?—A. No.

Q. Do you think that the men working in your Works will be able to spare the time necessary for imparting technical instructions?—A. The idea is that our staff will lecture in the evenings.

Q. It will be additional work, a work of love?—A. Additional work.

Q. In your experience of these several thousands of men that you employ, you have found the elementary education a great lack or hindrance to efficiency?—A. Yes. You bring a boy into the workshop and put him to work with a fitter or lathe man. It is more or less two years before he can read any measurements. He cannot write his name or take any written instructions in the vernacular.

Q. You have found that the absence of ambition in these labourers is also a great hindrance to their progress?—A. Yes.

Q. The remedy you propose is general compulsory education?—A. Education for the industry of the particular district.

Q. I understand you to say that you want elementary education first and then education suitable to the industry of the particular district added on to it?—A. My object is to first give them an elementary grounding, as they rise to a higher standard, bring in the work that one hopes will be useful hereafter.

Q. That is you will start them with general primary education and then add special subjects in which they may be trained?—A. Yes.

Q. You propose that for Europeans born in this country there should be compulsory education from the age of 7 to 15 and you would be in favour of similar education for Indians?—A. Yes. I think the lack of education is a great hindrance to industrial efficiency.

Q. You say "with the advent of the latest type of machinery something should be immediately done to provide the necessary technical training," and you apprehend that in the future after the war, the competition in trade and commerce will be keener, and more and more improved machinery will be employed?—A. What I feel at the moment is this. We are now accepting home theories. Plant brought out to this country from home is the very latest, the men available are not sufficiently highly trained to handle it to any degree of safety.

Q. And this plant is likely to be of a more and more improved type in the future?—A. Yes.

Q. And in order that you should have sufficient labour to handle this machinery, you want that technical schools and technical colleges should be established?—A. Yes.

Q. To afford the necessary practical training?—A. Yes.

Q. You think the absence of such technical instructions will be as great a hindrance as the absence of capital in promoting industry?—A. Yes.

Hon'ble Sir F. H. Stewart.—Q. You think your proposal about establishing ropeways instead of sidings in certain existing and otherwise equipped collieries would pay?—A. Yes.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. Who are the large purchasers of the silica bricks that you produce?—A. Tatas.

Q. Do you think you will be able to supply them with all their requirements?—A. I think so in a few years.

Hon'ble Sir R. N. Mookerjee.—Q. Have you a complete scheme for this ropeway as to what will be the cost and what income it will bring?—A. It is necessary to consider each scheme upon its merits. The quantity of material carried, the class of country the ropeway passes through are the chief governing factors.

Q. Then you propose to charge different rates to different collieries?—A. Certainly. It does not follow that the cost of putting a ropeway to carry 100 tons for one colliery will run out at the same rate as another line carrying the same quantity over a different contour.

Q. Is there anybody who can put that capital to do so?—A. No.

Q. If you charge different rates for the ropeway, will the people come to the ropeways leaving the sidings?—*A.* Your idea is that one company should run the whole of the ropeways in that particular coalfield?

Q. Because each individual company may not have capital to make its own ropeway as they have got sidings?—*A.* I do not think one company would undertake to deal with the whole output of Jherria and the Ranigunj coalfields. If a colliery is of reasonable size and can afford to sink pits it should be in a position to put up capital for the transport of coal.

Q. Most of the collieries are working with limited capital, you must not depend on the present temporary boom?—*A.* I do not think you can look at it from that point of view.

Q. My point is, are you sanguine that if you bring out this scheme of ropeway people will come forward to it and join the ropeway and give up their sidings?—*A.* I certainly think people who have sidings in their colliery locking up large quantities of coal will take them out and put in ropeways to deliver coal into waggons, if the amount of coal locked up shows a profit if extracted.

President.—Q. You can get a map of the coalfields showing the present sidings?—*A.* Yes.

Q. Is it possible for you, within any reasonable period, to draw up a sort of scheme showing how ropeways may be put in to replace the whole or most of these sidings, marking out your points of assembling certain groups of collieries? If you draw up a scheme of that kind, a certain number of these propositions will mature in the next five or ten years and gradually the whole field will be assembled by means of a system of ropeways to a certain point. If you had the information in the form of a map together with estimate and cost, it would be seen by people and perhaps you would form a syndicate composed of the leading colliery people in the district and this syndicate would be willing to finance the construction of ropeways as fast as the people of the district wished to go into it. Is it possible for you to do so? Is that not the best way?—*A.* We have no intention at present of putting forward such a scheme. It certainly pays us to centralize loading, it is therefore pretty certain other people will look into the question. It is quite possible to draw up a map of the sidings and show ropeways where lines at present are laid. Where a colliery has one siding dealing with the coal, that would not be improved by the installation of a ropeway, the efficiency comes in where there are a number of spurs radiating from the siding splitting up the property.

Q. Supposing you produce all this information at your own expense and trouble and form a syndicate, would that syndicate want to establish a right of pre-emption?—*A.* I am putting it forward in the public interests.

Q. What I want to know is, can you suggest any practical way in which it can be made of general use?—*A.* I think it could be done. We are considering ways and means of bringing sand from the Damuda river to the collieries for sand packing. Only short local alignments are necessary to deal with the coal question.

Q. The syndicate would want public rights?—*A.* Yes.

Q. And therefore exclusive rights?—*A.* I won't say exclusive rights.

Hon'ble Sir R. N. Mookerjee.—Q. You are very successful in your own colliery ropeway. But was not your colliery specially situated inasmuch as you have no other way to win your coal?—*A.* Are you referring to Saltore? A railway is impossible.

Q. Whether profitable or not you cannot win your coal without the ropeway?—*A.* This ropeway is erected on difficult ground and it is a costly line from the manufacturer's point of view. Even in this case we place the coal into waggons at less than one anna per ton per mile.

Q. Following the President's question, if you form a syndicate, you will know that there are coalfields where the siding is a straight line and they will not possibly join you?—*A.* I do not think they would.

Q. You cannot include every coalfield in a certain area.—*A.* May I show the plan of a ropeway?

Q. If you have to put in a ropeway in a certain area, and you cannot get every colliery to join your ropeway you lose the trade from that portion?—*A.* I am afraid you have not quite gathered what I mean. We cannot put in one line to deal with the whole of the coal. Collieries must run their own section bringing the coal to one central position instead of loading at a number of wharfs in their property.

Q. Have you got sufficient experience to tell us that a ropeway would be as efficient and as substantial as a siding?—*A.* Each colliery ropeway and siding must be considered on its own merits.

Q. There is more chance of obstruction in ropeway than in siding?—*A.* There is very little than can go wrong with a ropeway.

Q. It is no doubt a good idea to run a school where lecturing will be honorary work. But is it a feasible scheme?—*A.* What I intend to do is to train our own men. It is not intended for the public. The staff of the respective departments will lecture to the boys on the subjects they have been specially trained in. I wish you to understand that this is for our own, but I consider it necessary for apprentices throughout the whole field to be trained accordingly. I hope to see a college in Dhanbaid or Asansol.

Q. Up to what horse power engine can you construct in your shop with materials supplied locally?—*A.* We can construct engines up to 75 horse power.

Q. You have nothing to depend on imported materials?—A. No.

Dr. E. Hopkinson.—Q. You say that all steel castings have to be imported?—A. Perhaps I am not correct in saying all, very few steel castings are made in this country, such as those required for cut gears and ropeway work.

Q. Do you employ coal cutters?—A. We have employed them, we did not find them altogether a success. The machines were all right but the labourers wanted the same money for loading coal as they did previously for cutting and loading.

Q. Are you aware of any ropeways in operation in India?—A. Besides our own, the Bengal Iron and Steel Co. have a ropeway carrying iron ore, there are two at work in Burma, one is about 9 miles long.

Q. How many independent collieries might be involved in any particular general scheme of ropeways?—A. It is difficult to say, possibly 20.

Q. And you consider it impossible to get a combination of these 20 companies?—A. I do not say that. We erected our first ropeway about five years ago. Since then we have put in three for ourselves, another one is in course of erection in Burma, one for carrying passengers and merchandise in the hills is under consideration, the length of this is about 7 miles. Three others are in the course of construction.

Q. In the last paragraph of your evidence you say Government should assist engineers of this country to study the latest practices in engineering in the West. What have you in mind?—A. What I have in mind is this; an engineer working in this country for three or four years is out of touch with the latest tools and designs in use at home; when on leave a great deal of time is lost in getting into touch with the people who have the latest information, and they may not be willing to show what you want to see. If Government drew up a schedule of the latest practices adopted in the West and assisted men from this country to see these, the information would be of the greatest value to this country.

Q. Do you think that it is a matter for Government assistance?—A. I certainly think it is for the Government to assist the industry.

President.—Q. How is this to be practicable?—A. They could issue particulars of certain manufacturers pointing out how and where the information might be obtained especially on the continent and in the United States of America.

Q. Would not the appropriate technical associations do this for their own professions?—A. I don't think so.

Q. Dr. E. Hopkinson.—You suggest that Government should publish a schedule of what is to be seen in Europe and that they should then assist engineers in paying a visit?—A. We in India hope to be able to compete in any market, but there are no tool makers out here, for everything in this direction we must go West. We out here are entirely out of touch with what is going on at home, we cannot possibly keep up-to-date without applying for leave to study that particular branch of engineering at home.

Q. What you suggest is that the Government should prepare catalogues of these things?—A. I would not go so far as that, but Government might make it one of their duties to keep in touch with large up-to-date factories and assist engineers on leave to take full advantage of any new work during the short period they are in Europe, especially in the design and manufacture of tools.

Q. But the maker of the tool is generally a different person from the user?—A. This is so.

President.—Q. What we do in practice is this. You take the technical journals regularly and when you come across points that are of interest to you in your work you make a note of them and draw up your own little programme. When you go home, you may spend three or six months, and if on the top of that you think that you want an extra six months it is your affair. I do not see how the Government can draw up any kind of schedule. It is impracticable?—A. I do not think it is so. India should be able to compete with the West with manufactures.

Q. That is a fine idea, but is it possible for the Government to draw up a schedule of tools, which you should go and see?—A. You find that there are a great number of special tools.

Q. But you have got your own technical journals?—A. Journals are often published in the shape of advertisements. We require the actual practical efficiency. I do not want to throw out a good idea, but I cannot feel now that it is practicable for the Government to do that.

Dr. E. Hopkinson.—Q. What does your technical staff consist of?—A. In our colliery we have a technical man as manager, then two or three assistants who are mostly Europeans and Eurasians, and then the Indian technical staff with the Bengali as surveyor. Most of the surveyors are Indians. The winding enginemen are all natives.

Q. Practically the mining engineers and the two assistants are Englishmen and the rest are Indians?—A. Yes.

Q. You suggest that there should be compulsory education suitable for the industries of the particular district. What have you in mind?—A. I should like to educate the youth of the country to be in a position when he leaves school for the workshop or mine to take an intelligent interest in the work that lies ahead of him.

Q. You mean compulsory primary education?—A. The native in many cases is under-fed, this is very often due to lack of education. You often find if a native has four annas in his pocket he won't go to work until it is spent. We have given men clothing and other assistance, they sell the goods and remain away from work until they have spent the last pie. This is detrimental to health and only education can adjust such matters.

Q. What do you mean by saying education suitable for the industry?—A. I now refer to the workshop. We find a great number of men and boys are absolutely useless for the first two years of their training because they cannot read or write.

Q. You have in mind some different form of education?—A. What I should like to do with the people in our compound is to teach them to read and write, afterwards as they improve the elementary principles on which their life's work will be based.

Q. To teach them to read and write and at the same time technical training?—A. Yes.

President.—Q. Would you have manual training in the primary schools or would you have primary schools for simple education and then separate industrial schools to teach the boys the rudiments of industry, because in primary schools you cannot get the right class of men to give training in manual work?—A. On the lines of an industrial school.

Mr. A. Chatterton.—Q. I gather from your note on education that it is necessary for proprietors of engineering works and collieries to make their own private arrangements for the education of their workmen. The existing facilities for education are not sufficient?—A. I do not consider education for the menial classes has received the support it should have had.

Q. In carrying out your idea would you confine it to primary education in a school and afterwards provide industrial education in the workshop?—A. I would prefer the industrial education.

Q. That will be before you put them in the workshop?—A. Most of the boys are useless when they first enter the workshop.

Q. The ideal that you are working up to in making education compulsory is that your workmen should have a certain amount of education before they come to your workshop?—A. Yes.

WITNESS No. 94.

MR. J. PRESTON, *Chemical Engineer of Messrs. Simon-Carves, Ltd., Manufacturers of bye-product ovens, tar-distilling plants, etc., Manchester.* Mr. J. Preston.

WRITTEN EVIDENCE.

With the exception of the East Indian Railway at Giridih and the Bengal Iron & Steel Co. at Kulti, practically the whole of the Indian output of metallurgical coke has for many years been manufactured by the most wasteful methods possible. The open country oven which is in general use is even more wasteful than the old British beehive oven which is now considered to be obsolete.

A further advance has been made in the coking and bye-product recovery industry by two large new installations being put to work, one at Sakchi Works and the other at the Lodna Collieries.

With large iron producers, who have large expert staffs, it is a natural sequence for them to adopt scientific methods of coking, thereby reducing the cost of their final product to a minimum. This is not so with the collieries; their chief product is coal, in most cases any coke which is produced is looked upon as an insignificant subsidiary product which requires little consideration.

Many colliery owners and managers would appear to have an antipathy against scientific distillation and coking of their coal. I think the reason for this is that the true facts of destructive distillation and the recovery of bye-products have never been put before them except by such people as myself who are personally interested in pushing the industry.

The loss by coking of coal in the Jherriah field is a serious one which will increase year by year. I beg to put before you a conservative estimate of the loss occasioned by the use of the open ovens.

During 1915 there were about 225,000 tons of hard coke produced. For this quantity approximately 450,000 tons of coal were used. Had this quantity of coal been coked in a scientific manner 337,000 tons of coke would have been produced; there was a loss of 112,000 tons of coke. Taking the low estimate of recoverable products at 1 per cent. of ammonium sulphate, 2½ per cent. coal tar and 2 gallons per ton benzol, the total loss was as follows:—

112,000 tons of coke nett profit	Rs. 3-0 per ton	Rs. 3,36,000
4,500 tons ammonia	" " " 150-0	" " 6,75,000
11,250 tons coal tar	" " " 50-0	" " 5,62,500
900,000 gallons of benzol	" " " 0-8 per gallon	" " 4,50,000

Total . Rs. 20,23,500

There were also during 1915 about 75,000 tons of soft coke made in the Jherriah field. On this also there would be similar losses. The total loss to the country is enormous, as you can quite realize from these figures. Although there are no figures available showing total productions of soft and hard coke in all fields, it is well known that some hard coke and the bulk of the soft coke is produced in other fields than Jherriah.

In my opinion the time is not ripe for any legislative steps to be taken in India to stop this waste, as by so doing great hardships would be inflicted on many colliery companies. I think the Government should start an active propaganda to point out the advantages to colliery owners of coking their coal in a rational manner.

The Government could assist the industry by instructing the State Railways to specify that all the coke that they purchase must be manufactured in bye-product recovery ovens. This would not be feasible just at present as competitive tenders for this coke would not be obtainable, there being only one plant manufacturing such coke for the open market.

One of the great drawbacks to the general introduction of bye-product recovery coke ovens, is the numerous small coal concerns who manufacture very small quantities of coke but whose aggregate production is large.

I do not consider that it would be a commercial proposition to instal plants of capacities under 30,000 tons of coal per annum. I would strongly advise that wherever possible plants of no less than 50,000 tons per annum should be installed. Such plants are much too large for many collieries, therefore the most economical way would be to instal plants in central positions common to a number of small collieries.

The following are the processes which could be adopted for treatment of various classes of Indian coal :—

- (a) *High temperature distillation*.—Manufacturing metallurgical coke, coal tar, ammonia and benzol.
- (b) *Low temperature distillation*.—Manufacturing soft coke or smokeless fuel, fuel oils and ammonia.
- (c) *Complete gasification of the coal*.—For recovery of the available nitrogen as ammonia.
- (d) *Combination of processes (a) and (c)*.—First submitting the coal to process (a) and then completely gasifying the resultant hard-coke by process (c).
- (e) *Combination of processes (b) and (c)*.—First submitting the coal to process (b) and then completely gasifying the resultant soft coke by process (c).

Process (a)—The Jherriah, Giridih, some of the Barakar seams and Dishargarh coals are suitable for process (a). In the case of Dishargarh the coal would require compressing before coking to obtain a good hard coke suitable for metallurgical purposes. From tests made the bye-product yields from the Dishargarh seam exceed any other in India.

It is of extreme importance that only first class coals with minimum of ash should be used in the manufacture of metallurgical coke. There are many second class coals which make a hard coke of excellent appearance, but such coke, owing to the high ash content, cannot do other than hinder the development of the hard coke industry of the country.

Process (b)—There is a considerable market for soft coke or smokeless fuel in India and this market, in my opinion, is capable of great expansion as wood fuel becomes more scarce. I find that buyers and users of this fuel do not consider it important that it should possess a low ash content. They require it to be smokeless, easily ignited and above all to be cheap.

Most of the Indian second class coals are suitable for use in process (b).

Process (c)—This process would only be suitable for non-coking coals. It would be uneconomical in itself for treatment of any coal which is either saleable or suitable for processes (a) or (b).

There are many seams of coal which are not worked because of their high ash content; yet they could be as cheaply worked as those which are constantly being worked under all market conditions and, if completely gasified and the available nitrogen recovered as ammonia, be a considerable source of revenue to the country.

Processes (d) & (e)—These processes are suitable for unsaleable coking coals. The choice of the process which would suit any particular case would depend upon local conditions and the nature of tar or oils required.

All the colliery owners know the demand for hard and soft coke; many of them recognize that the demand must increase as more industries are established in India. They have little faith in the bye-products market of which they know so little.

There is a world-wide market for sulphate of ammonia at remunerative prices. The world's increasing production cannot keep pace with the demand. On this point, I beg to refer you to the statistics given in the last ten years' Reports of the Chief Inspector under the Alkali Act (Great Britain).

You will find, if the figures of market values over the same period were available that, in no instance, has the price dropped as the production has increased.

India is now using a small quantity of this salt as a manure. In my opinion, every effort should be made to encourage its further use, until the full production is utilized in India. It appears to me to be a waste of the Empire's resources, for India to export such a

valuable nitrogenous manure as sulphate of ammonia and at the same time to import nitrate of soda and other nitrogenous manures. The further use of sulphate of ammonia in India, would not financially benefit the producer as the whole production is sold on the basis of British prices.

The whole output of Indian coal tar is at present being sold in the crude state for painting, etc. It is quite patent to everybody that this demand will be limited, and that as the production increases, it will become necessary to find other outlets for the tar. The natural outlet would be the establishment of the coal tar distillation industry. This industry would be a very valuable one for the country, as it would make available many useful commodities, such as, creosote oil, for treating railway sleepers; carbolic acid the basis of the well known high explosive picric acid; benzene, the source from which aniline is prepared (and it is from aniline that most of the coal tar colours are derived); naphthalene, which is now largely used in India as a disinfectant and is also a source of other coal tar colours.

To give you a general idea of the usefulness of coal tar distillation, I may say, it has been estimated that from the tar produced from one ton of good coal there can be obtained—half a pound of magenta, which will dye 375 square yards of material; one and a half pound of carbolic acid, six and a quarter pounds a naphthalene, half a pound of anthracene (the starting point from which the beautiful series of alizarin colours are derived), besides a host of minor products used as medicines, as developers in photography, sugar substitutes, etc. Of colouring matters alone over three hundred owe their source to coal tar.

There is one bye-product which is not at present recovered at existing bye-product plants in India, *i.e.*, benzol. Many people considered and some are yet of the opinion, that the recovery of benzol would be impossible in India, owing to climatic conditions. I have had considerable experience in the working of bye-product recovery plants in India; and after a careful study of the question, I have come to the conclusion that, provided the plant was designed on proper lines to suit the climate, the recovery of benzol would be quite efficient.

If benzol were recovered it could be used for motor fuel or utilized with more advantage for the manufacture of aniline, high explosives, and solvents for rubber and varnishes.

If process (c) was adopted, there would be available a large quantity of gas of a value of about 150 B. T. U. per cubic foot. This gas is very suitable for use in gas engines, which would cheaply generate electric power. The electric power could be used in electro-chemical or electro-metallurgical industries, or for general power purposes.

I have frequently been asked if it would be a commercial proposition to coke large quantities of second class Jherriah coal, simply to recover the tar ammonia and benzol and dump the coke which would be produced in such large quantities that a market could not be found for it. If such a plant were large enough it would be a success financially, but, from the economical point of view, it would be as sinful as the present deplorable waste of valuable bye-products in the Jherriah coalfield.

My experience shows that much has been done to improve the labourers' and mistries' Training of efficiency in constructional work by the importation of foremen from Britain who are labour and themselves first class craftsmen. It is rather difficult to select suitable men for this supervision. work, the men required are those who when they arrive in India will take up the tools and actually show the mistry how the work should be done. I find that the Indian mistry is not so conservative as is generally supposed. He has a great admiration for a man who is a better craftsman than himself and will adapt himself to improved methods.

I have seen carried out in this country a large amount of setting of refractory material by mistries who became quite as capable as British workmen and their finished work quite as good. I attribute these good results entirely to the skill and patience of the foreman and to the mistries' willingness to learn. The mistries so trained are now an asset to the country and to the particular industry under review.

I have found it rather a difficult problem to train the Indian labour to work a bye-product recovery plant efficiently without a large amount of supervision. The average labourer is quite willing to learn but he is hindered considerably by lack of elementary education and inability to grasp the most elementary principles of the industry.

The moderately educated Indian would be most useful in this industry if he would soil his hands by a little manual labour instead of his whole ambition being to obtain a "nice clean" clerkship.

I am of the opinion that for the bye-product and chemical industries generally, a number of Indians should be selected for training in various works. The training should not consist simply of assisting the existing supervising staff, the men should be employed in the actual working of the various processes, thereby gaining not only a knowledge of the actual working but also an inside knowledge of the labour, what it is capable of doing and what it is reasonable to expect of it.

ORAL EVIDENCE, 1ST DECEMBER 1916.

President.—Q. How long have you been in India?—A. About six years.

Q. Have you been engaged in chemical work all the time?—A. Yes.

Q. The question of increasing the number of bye-product recovery plants is largely one of the capital outlay that will be required in view of the fact that you can only organise work of

this kind on a large scale. I suppose that is the real difficulty?—A. There is no difficulty in finding the capital for it. The difficulty is to find the people in India who have confidence in the business.

Q. In what way will capital be found for a small concern?—A. You cannot have a small concern because it would be uneconomical in itself. The smallest plant I should recommend is one to deal with 30,000 tons of coal per year.

Q. You say that in 1915, 225,000 tons of hard coke were produced and you estimate the products that were wasted owing to failure to introduce the bye-product recovery plant, and then you go on to say that during 1915, 75,000 tons of soft coke were made in the Jherriah field and you say that there would be similar losses? I suppose you mean proportionately smaller losses?—A. Yes.

Q. Most of your note is quite obvious to any one who has taken an interest in the questions that you deal with. You say that Government should start an active propaganda to point out the advantages to colliery owners of coking their coal in a rational manner. What is it necessary to do in addition to what has been done? The history of the case is that in 1904 the Geological Survey published the proposal made at Giridih by Mr. Ward, who is the pioneer of bye-product coke in India, and since then the matter has been mentioned at various times before the Mining and Geological Institute. The Mining and Geological Institute practically includes, I understand, every colliery manager in the country so that in that way the subject is prominently brought to the notice of the colliery managers. What more can Government do?—A. The Government can take up the matter and put it before the colliery people from a disinterested point of view. We cannot expect them to take advice entirely from men who are interested in building the plant. If the Government or some one of these societies will put the matter forcibly it would be beneficial to the country.

Q. It has been stated openly and publicly that there is waste and it has been shown by actual demonstration at Giridih. I do not see in what way one can do more. The managers are well aware of the wastage and they have the opportunity of bringing it to the notice of the owners with regard to their own particular propositions. Can you suggest anything more definite and more efficient?—A. The colliery managers are well aware of the waste and I know many who have from time to time put the matter before their managing agents, who almost invariably treat the matter in a similar way to what the British Colliery Powers and Ironmasters did in England 20 years ago. May be the real trouble is that the managing agents are more interested in current dividends than in the results they would receive from the proper conservation of the coal. In my opinion the time is not far distant when the Government must recognize that people who waste the country's resources must be prevented by law.

Q. Am I correct in supposing that a few years before the war people at home neglected to put up benzol recovery plants simply because the price of benzol had gone down greatly. Except the ones that had already been in existence very few new benzol recovery plants were put up?—A. I do not think it was the case. There was a certain prejudice among a certain number of people who said that benzol was not a paying proposition. The benzol proposition has always been a paying one in England. Messrs. Simon-Carves, Ltd., have installed benzol plants along with every bye-product recovery plant they have built since 1888.

Q. You think it would be a paying proposition in India?—A. I think it would be in India.

Q. Have you put up one here?—A. There is not one in India yet.

Q. Your firm is ready, I understand, to put up plant for the sake of part of the bye-products. Are you in a position to gauge the conditions in this country and to adopt a system similar to that adopted at home?—A. We have made various suggestions and proposals to people out here, but they have considered it to be such a good thing that they have found all the money themselves.

Q. There would still be a good many who would probably prefer to give up the profits for the sake of avoiding the risk of the capital outlay?—A. We do not find it in recent years. Generally speaking, when coal owners seriously investigate the matter they would purchase the plants outright and thus reserve for themselves the whole of the profits.

Q. Have you found any special difficulties regarding the climate in carrying on the work in this country?—A. We have found difficulties. These have now been overcome by modifying the plant to suit the climate and simplifying wherever possible to suit Indian labour.

Q. Can you tell us what the precise difficulties were?—A. Mostly from the point of view of the difficulty of the complete extraction of the tar from the gases owing to the high temperature of the atmosphere and cooling water, also the loss of ammonia by evaporation from the crude liquor during storage before distillation. These troubles have been entirely overcome by recovering the tar by mechanical means without previously cooling the gases and by passing the hot tar freed gas directly into sulphuric acid for the recovery and manufacture of sulphate of ammonia.

Q. Would there be any serious loss of benzol on account of its low distilling point?—A. It would be necessary in India to instal refrigerating plant in connection with the recovery of benzol. This would add a cost of 1 anna per gallon to manufacturing charges.

Mr. C. E. Low.—Q. Do you think it would be an incentive if Government started the making of Trinitro tolnol?—A. Certainly it would.

Q. What amount of tolnol is yielded by ordinary coal?—*A.* Out of a thousand tons of coal we get approximately two thousand gallons of benzol, about 14 per cent. of this would be tolnol.

Q. Would you suggest that the producers should make T. N. T. or that Government should do it?—*A.* It would certainly be better for Government to do it. An expert staff would be necessary for the manufacture of T. N. T. The collieries and ironworks would have quite enough to do if they recovered the bye-products and left it to the experts to work them up into T. N. T.

Q. What is this soft coke used for and who uses it?—*A.* It is fairly extensively used all over India.

Q. For domestic use?—*A.* Yes. The natives burn it all over the country wherever they have not got cow dung or wood.

Q. How far does it go?—*A.* The business is entirely in the Indian merchants' hands and they are the only people who could give this information.

Q. Is any Indian coal tar at present exported?—*A.* No.

Q. Have you made any experiments in low temperature distillation?—*A.* To some extent. Our experiments were cut short owing to the war as shortage of staff took place, but the results we obtained were very promising.

Q. You think that the coals are suitable?—*A.* The coal is suitable and cheap.

Q. Have you tried the different kinds of coal with a view to find which is the most suitable?—*A.* We have tested most of the coals in the laboratory and practically all the Jherriah coals.

Q. And also the Ranigunj coals?—*A.* The slack coal must be taken out of these coal for low temperature distillation.

Q. Do you find the Ranigunj coal useful for these experiments in low temperature distillation?—*A.* The Barakar series are better and give very exceptional results. In that series we get a yield of nearly 40 pounds of ammonia per ton.

Q. Have you placed your results at the disposal of the Director of Geological Survey?—*A.* All our tests have been done for private individuals.

Q. When it has passed the stage of interfering with private interests would you be free to do it?—*A.* Messrs. Simon-Carves, Ltd., Manchester, would be pleased to put our results of tests of Indian coals at the disposal of the Director of Geological Survey.

Q. Assuming that the Director approves of your results that would help you in the propagation?—*A.* Quite so. Yes.

Q. Merely for want of information many of these things are inactive?—*A.* Yes.

Hon'ble Pandit M. M. Malaviya.—*Q.* You say that the average labourer is quite willing to learn but that he is hindered considerably by lack of elementary education. Do you think that if he had a little more primary education supplemented by industrial education that would be better for him and for you?—*A.* Yes. He would be more useful.

Q. So that in your opinion the money spent on primary and industrial education will be a direct encouragement to the industry?—*A.* I think so.

Hon'ble Sir R. N. Mookerjee.—*Q.* You represent your home company?—*A.* Yes.

Q. May I ask you the name of the firm?—*A.* Simon-Carves, Ltd., 20, Mount Street, Manchester.

Q. You say that you could put the plant for the coal industry if the sale of the products could be guaranteed?—*A.* This only refers to benzol and tolnol, as far as the other products are concerned there is already a certain market in India.

Q. If the security was good what will be the condition?—*A.* This is a matter which could only be decided by the Director of the firm I represent.

Q. What quantity would you ask the Government to take?—*A.* The whole output of a plant. I understand this matter has already been put before Government who rejected the proposal.

Q. Government might find it expedient to change this attitude. Could you write a confidential note to the President?—*A.* I shall do that.

President.—*Q.* The question is one of importance in this way, that there are some people who would lay out the capital for bye-product plant on condition that the bye-products were purchased for a certain number of years so that risks may be avoided. I know that in the earlier days you were not prepared to undertake terms of this kind as you knew nothing about the market for the bye-products. Now after this experience of ten years you are able to move along these new lines?—*A.* We are in a position to do that. We know the Indian market for bye-products with the exception of benzol.

Q. You might make a general statement to the effect that a certain portion is to be taken for a certain number of years so that the concern may have an assured future?—*A.* I have already mentioned that, with the exception of benzol, the sale of the various bye-products presents no difficulty.

Q. It would do quite well if you could give us a statement* confidentially as to the quantity you would expect Government to purchase in order to justify your putting up an

* Not received at the time of going to Press.

installation plant and also the extent to which your firm would be prepared to supply recovery plant?—A. I could do that quite well.

Dr. E. Hopkinson.—Q. You say that you are able to eliminate tar from gas. May I take that as a categorical statement?—A. We are doing it successfully in India.

Q. Without reduction of temperature?—A. Yes.

Q. Can you make the gas so free from tar as to be suitable for use in gas engines?—A. Yes, however it would not be practicable to use hot tar free gas in gas engines owing to the fact that in practice the gas after being freed from tar is at a temperature and dew point of about 60° C. and is therefore fully saturated with water. It can be understood that it would not be economical to allow all this water to pass along with the gas to the engines. It is necessary to cool the gas down to atmospheric temperature to eliminate the excess water. I am also a great advocate of further purification of gas for gas engines by roughly purifying with iron oxide.

Q. That is a new proportion?—A. We have used it for the last six or seven years.

Q. You get rid of the tar by cooling?—A. We get rid of the tar entirely by mechanical means.

Q. I see from your calculation that you take the ammonia at 22 pounds per ton? Why is it so low?—A. I have made it low so as to give a safe calculation. Some of the Indian coals give very low yields.

Q. Is that a fairly safe calculation?—A. Yes.

Q. Do you think that the difficulty of obtaining sulphuric acid acts as a bar to the adoption of your plant?—A. I do not think so at all. We are able to arrange for acid supply to any plant installed by us.

Q. So far as your experience goes there has been no difficulty?—A. No.

Mr. A. Chatterton.—Q. Have any attempts been made to popularise the use of soft cokes for domestic purposes by providing proper apparatus for burning them in?—A. Not as far as I know.

Q. Has any proposal been made to get these soft cokes briquetted?—A. There is a scarcity of pitch in India.

Q. Is it essential that you should use pitch. Would not the tar do?—A. You must have pitch, tar is unsuitable. The minimum amount of pitch required is about 5 per cent. with special coke and for ordinary work about 7 per cent., hence the cost price of briquettes would be far above the market rate for first class coke.

Q. Is the market for these bye-products entirely outside India?—A. The tar is sold in India. Part of the ammonia is exported. The use of sulphate of ammonia in India is increasing every year.

Q. Do you know whether it would be better to use benzol mixed with alcohol?—A. That is a debatable question. It would, in my opinion, be more economical to mix it with alcohol.

Q. Do you know whether if benzol was mixed with alcohol, the alcohol would be sufficiently denaturalised for practical purposes?—A. I think so. I would not drink it afterwards.

WITNESS No. 95.

Mr. B. Starks
id.

MR. B. STARKS FIELD, *Manager, Pandakonali Coal Co., Ltd., Loyabad, Bansjora Post Office, Manbhum.*

WRITTEN EVIDENCE.

Coal mining.

My experience relates especially to the practical part of coal mining in the Jherria coalfield, and the following are some of the directions in which I consider improvement and further development of the industry ought to be sought after.

Regulation and
control of labour.

Unless something is done in this direction great improvements in the efficiency and output of the collieries cannot be expected.

As the pits get deeper, the workings more complicated, and the use of machinery extended, it becomes more and more important that the working of the mines be carried out systematically.

At present there is much valuable plant installed at many collieries capable of dealing with much greater outputs than are at present being produced. Under present circumstances this machinery is generally standing idle for a large portion of its time, neither giving the investor the proper profit on his outlay, nor contributing its fair share to the produce of the country.

This is not due to the fact that an increased output could not be disposed of, but to the irregular habits of the miner. The miner goes to work or leaves practically at whatever time he feels inclined during the day or night. The result of this is, that the winding apparatus has to be at his disposal when he desires, often seriously interfering with the work of raising coal; the underground system of haulage is disorganised, and the result is a general loss of efficiency all round.

It is a common practice in certain districts of the coalfields for a miner and his wife to work 24 hour shifts, and of course as no miner can work 24 hours on a stretch, much of this time is wasted underground in sleeping and idling, with the consequent loss of efficiency. This practice from many points is most undesirable, not the least of which is the disadvantage to health which must accrue from spending so many hours at a time underground.

It may be said that these conditions could be easily remedied by the management, but when it is considered that many collieries are grouped closely together in more or less congested areas, and that none ever have an adequate supply of labour, any pressure in the direction indicated would mean that the labour would promptly walk off to a neighbouring colliery where no restrictions were being imposed.

I feel sure that if a system of regular shifts could be made compulsory by law, it would be greatly to the benefit of the industry.

I would divide the day into two shifts, *i.e.*, the day shift and the night shift, and that miners be allowed to descend on the day shift before 6 A.M. or after 8 A.M., and except in cases of sickness or accident no miner to be allowed up before 4 P.M. and that all day shift labour be out by 6 P.M. The same hours to take effect in the night shift. In Britain miner's shifts are regulated by law.

Beyond the interest taken in the labourers by individual managers and assistants, I am not aware of any effort that has been made to improve the labourer's efficiency and skill in the mines. As a matter of fact I cannot suggest any means by which this could be done effectively, as the skill of the miner can only come from his strong arm and his individual experience at the coal face. Training of labour and supervision.

With regard to the training of other workmen employed underground, such as timbermen, line khalassies, etc., the only way to improve their efficiency is by giving them practical instruction in the mine, and by placing them along with superior and better skilled men.

For those who aspire at higher posts, such as subordinate officials, great good could be done by a system of night schools, to which the workmen could attend without interfering with their daily duties.

In England the best subordinate officials are generally selected from the steadiest and best workmen and my experience in this country is that men who have been practical working miners make better overmen and sirdars than men of better education who generally start work at the mines as munshis.

Properly arranged night schools would specially benefit this type of man and improve his efficiency.

With regard to the training of apprentices who are designed for the supervising staff and for managers, it is a matter of great importance that the young men should have a sound elementary education before beginning their apprenticeship, and that they should regularly attend technological classes during the period of practical training in the mines. Apprentices and mining students.

Much good work has been done by the local technical evening classes in the coalfields, but the lecturers have always been hampered by a lack of elementary knowledge among most of the students. To get over this difficulty, further classes could be held on other nights covering the elementary ground required by the students to enable them to take full advantage of the technical classes.

I am of the opinion that the mining course given at Sibpur College would be of much more value if it were coupled with practical experience at the collieries. Mining being a profession that can only be learnt in the mine, I consider that all mining schools ought to be adjacent to the collieries.

My experience of the Sibpur College boy who has completed his mining course away from the collieries is that he thinks he has learnt his profession (although he may not have seen a colliery except at the annual camp held in the coalfields at which he may have attended twice or at most thrice) and only now needs to put in the necessary practical work the law requires for him to sit for his colliery manager's examination and to get his certificate which he thinks will be his cheque book for life.

If the mining school were established at Dhanbaid or Asansol, the mining student would have the opportunity of combining his daily tuition with practical demonstrations at the various collieries, and also (what is most important in my opinion) give him some practical idea of the duties and responsibilities that will devolve on him in his future career.

As a mining college it could also form a technological institute for colliery apprentices and subordinate officials for whom special lectures could be given.

With regard to this subject, at present it is not necessary for engineers in charge of prime-movers to be certificated in this province, and unless an engineer can produce a Board of Trade certificate, or one of the certificates granted in other provinces, there is no guarantee of his knowledge or ability to take charge of machinery. Mechanical engineers.

Many incompetent men, calling themselves engineers, are constantly seeking employment, their ignorance often only being discovered after damage has been done to machinery placed under their charge.

I consider it would be a good thing to have a standard mechanical engineer's examination held throughout British India once a year at the same date and time, for men who are usually in general charge and responsible for the running and repairing of machinery.

Although the machinery employed in the various industries of necessity must vary considerably, in design the principles are technically the same. As much of the machinery now employed is electrical this examination could cover the necessary ground; or a second examination could be held for electrical engineers who have first obtained their mechanical engineer's certificates.

Khalassies.

Men, such as engine drivers, boiler-minders, and pump-men, I think should pass suitable tests before being placed in direct charge of prime-movers. This would undoubtedly raise the standard, tend to efficiency, and save much damage that is frequently done to machinery and plant, owing to neglect and ignorance.

Workable coal locked up.

With regard to the supplies of raw material the use of which is restricted by preventable causes, I feel that the great amount of valuable coal that is locked up under ordinary colliery sidings comes under this head.

At present the usual custom before the railway company serves a colliery is, that it acquires under the Land Acquisition Mines Act the necessary land for a siding *plus* a considerable strip on each side which is considered necessary for support.

The railway company then immediately imposes restrictions on the working of the coal existing below the acquired land. Therefore a colliery to be served with a siding must relinquish the right to work a large proportion of its available coal. This coal so locked up, is undoubtedly a very serious loss to the colliery company, and of course to the country.

If collieries were served by their own private sidings, and gave a guarantee, or in some cases a deposit to the railway company to cover all probable damage to any rolling stock due to any subsidence, then the collieries could work the coal under their sidings as they found best, and in cases of total extraction they could create suitable diversions to serve them during the period of subsidence, and if found advisable after the subsidence had settled could again bank up the original line, and relay the rails.

If these methods could be adopted they would immediately liberate for the market a large amount of coal now locked up.

Why the railway company should acquire a strip of land generally overlying a considerable part of the best workable seams of every colliery it serves, and then imposes absurd mining restrictions upon all the coal underlying those sidings, I, from the point of view of one whose duty it is to mine and bring to the surface in a marketable condition a maximum amount of mineral from the area under my jurisdiction, cannot understand.

Every ton of coal so locked up, is a loss to the country and to the world at large, because in cases where a colliery extracts the coal on each side of the acquired land, the coal left for the support of the railway siding would be locked up and lost for ever, as it would not pay to sink pits only to recover this coal once the area was goafed.

Economical working of the available resources of first class coal.

There is no doubt but that our present methods of mining coal are wasteful, and in so far as is known many of our best coals, which are rapidly being exhausted, cannot be replaced by seams of the same quality; therefore every possible endeavour ought to be made by Government to reduce this waste to a minimum.

The total extraction of thick seams by the "bord and pillar" method, which is generally in vogue, is practically impossible; besides, much good coal has been and is being lost by making the original pillars too small, thus making it impossible to subsequently extract them.

Of course, this method of working gives a quick return, and also means a cheap cost per ton for a colliery during the earlier part of its life, but whatever gain is made in this direction is much more than lost by the increased cost of working at some future date.

I would suggest Government appoint mining experts and others to consider the best and most economical methods of working for the benefit of the country, and report on it.

The lines I would suggest would be the consideration of the replacing of the coal extracted by means of other material brought from the surface.

What is known as hydraulic packing has been carried on successfully in European countries, and having regard to the fact that the Damuda river, from which a vast amount of sand is available, flows within a few miles of most of the collieries, there is no doubt that this store of material could be conveniently used for the purpose of packing.

There are certainly difficulties in the way of this suggestion, all of which could, I believe, be surmounted, and if hydraulic stowing could be adopted, it would give us the following advantages:—

- (1) all questions of support to the surface would be a thing of the past;
- (2) the present dangerous system of extraction of the pillars would no longer exist;
- (3) underground and job fires would be unknown;
- (4) practically the whole of the remaining portions of our first class coals would be won and utilised.

These advantages would more than outweigh any primary consideration of quick return and abnormally cheap working.

How Government could assist future development.

The Government might greatly increase the knowledge of the conditions of the seams in the coalfields by a regular system of borings to the dip, as by this means the existence of valuable coals may be proved, which, if discovered, would undoubtedly attract capital in the future, and also enable a better estimate of the mineral resources of the country to be made.

Governments of European countries have undertaken this sort of work with beneficial results.

The knowledge gained by the Geological Survey of India has proved a great boon to the mining profession, but in so far as the present coalfields are concerned, I feel that much more valuable information could be gained by deep borings in the known coalfields.

There is no doubt that at present our methods of utilising coal are exceedingly wasteful, and in the light of our present knowledge I am of the opinion that no coal at all ought to be consumed for heating purposes as coal, but ought to be entirely converted into the various commercial products that can be obtained from it, and for which there is a worldwide market, the residue coke and waste gases being utilised for steam raising and other heating and power purposes. Utilisation of coal.

There are of course many difficulties in the way of this ideal, and it is undoubtedly far off yet, but this is certainly the direction in which to look for economy and industrial development in the coal trade.

Coke is made fairly extensively in the Jherria coalfield in open ovens, and in many cases coal is partly carbonised in open heaps and converted into what is known as soft coke. This is without a doubt a sinful waste of the country's resources, a remedy for which is happily appearing on the horizon of the future.

Bye-product coking plants are beginning to spring up in the coalfields, and will most probably be the forerunners of others, as the products extracted rapidly create lucrative markets.

The great obstacle to the development of the bye-product industry is the initial expense of the plant which is much too great for most colliery companies to undertake.

This difficulty could be got over by the smaller colliery companies, many of which are controlled by the same agency, combining to form bye-product coking companies, which would take over and deal with practically their entire output of slack.

This industry could be greatly assisted by the granting of special carrying facilities for the slack and coal from a group of collieries to the central bye-product plant.

As the industry develops a large quantity of cheap coke would be thrown on the market which would make it worth while for steam users to consider seriously the question of coke fired boilers.

ORAL EVIDENCE, 1ST DECEMBER 1916.

Q. President.—How long have you been out here?—*A.* Ten years in the Jherria field with the exception of about three months at Saltore in the Ranigunj district.

Q. You have seen something of the working of the evening classes for young apprentices?—*A.* Yes, I was a lecturer for three years.

Q. We were told yesterday that these classes had gone down in attendance since Mr. Griffiths' time. Could you give us any idea as to why they are dropping off in attendance?—*A.* I don't know what the attendance is at present, but in 1912-13 I used to have about 70 students.

Q. They were trained up to the first class certificate?—*A.* It is practically impossible to do that with the class of men we get. The greatest difficulty we had was that a student had not a sufficient elementary knowledge to understand the lectures, and a considerable amount of time had to be spent on instruction that ought not to have been necessary.

Q. Would you propose to get over that difficulty by establishing an elementary night school on the coalfields?—*A.* I would suggest that, not quite for the same class of man but for the subordinate officials.

Q. So you want three or four different types of schools?—*A.* The first I want would have to be evening schools, similar to what we have at home, where we could teach mining, and also on other nights have lectures on mathematics, machine construction, and other subjects that would assist mining students.

Q. With distances that are very great, would it not be a more effective form of instruction to have, instead of evening classes, a few days of work put aside or a certain number of months in the year?—*A.* On the Jherria coalfields distances are not so very great. There are a number of large collieries round Sijua, where there are good roads. Most of the students have cycles. In the Jherria Division you have another group of collieries and in no case has a boy to travel a very great distance. It would be a matter of two or three miles at the most.

Q. You think the difficulty would be got over by multiplying these schools, so as to set them up in most convenient centres, or a larger number of convenient centres?—*A.* Yes.

Q. How are you going to finance these many schools; do you want Government to pay for them?—*A.* Yes.

Q. Government does not get any money out of your coal trade?—*A.* The coal trade certainly ought to assist.

Q. What about the royalty owners, do you propose to squeeze them too?—*A.* Yes, certainly.

Q. How is it going to be done: with the Permanent Settlement of Bengal?—*A.* That is a detail which will have to be settled.

Q. It is very easy to propose that Government should pay for all these things, but Government is not getting any revenue out of your coal?—A. The country is certainly getting a good deal out of the coal trade.

Q. If Government has to pay for these things, it has to get somebody else to pay and that somebody is the unfortunate raiyat, so that you would make the raiyat pay for setting up competition for labour?—A. I am certain that most of the large firms of standing would be very willing to contribute to it if approached, because they would do it in their own interests.

Mr. C. E. Low.—Q. Are you aware of what the conditions are in Bengal and Bihar and Orissa? Are men not allowed to be in charge of steam boilers who do not possess, at any rate, a third class certificate?—A. Men are allowed to be in charge of boilers in the Bengal coal-fields without a certificate.

Q. Up to what size boilers?—A. Any size, there is no restriction as far as I am aware. The only restriction is that the boiler has to be examined once a year by the Boiler Inspector. The boiler man has no certificate.

Q. No boiler is allowed to be worked unless there is somebody who is supposed to be in charge of it possessing, at any rate, a third class certificate. That is the law which I understand is in force in most parts of India. Is there nobody about the place that has got this certificate?—A. It is not in practice in the collieries, and I have never heard of it before.

Q. How would the coal mining interests regard your proposal of compulsory shifts; would they be in substantial agreement on the subject or would there be much difference of opinion?—A. I think they would practically all agree.

Q. You consider that the present mines inspecting staff would be capable of seeing that it was enforced, or would they require to be increased to do so?—A. I hardly think there is sufficient inspecting staff to see to it.

Q. I suppose you would manage as they do at home, not by factory legislation, but by legislation under the Coal Mining Act?—A. Yes.

Q. That would prevent you from having two sets of Inspectors for looking after the same things in the same mine?—A. Yes, it would do that.

Q. Do you propose to have standard mechanical engineers' examinations throughout British India once a year at the same time and date? You may take it from me that in most provinces in India, at any rate, a man is not allowed to be in charge of steam boilers unless he has a certificate for which he must have had a certain amount of practical experience and have passed an examination held by the Board in each province. Was that recommendation of yours made in ignorance of the fact that I now tell you, that many provinces, at any rate, do have an examination?—A. I was aware that there were examinations in some provinces, but not in Bihar and Orissa.

Q. Would your recommendation apply also to other things than steam boilers; would it apply to oil engines, for instance?—A. Certainly, but I propose here to have two sets of certificates. I should have another suitable test purely for pump-men and other men in charge of machinery. The first certificate would be for colliery or mill engineers, who are very distinct from engine drivers.

Q. You have no experience of any inconvenience caused by the fact of certificates given in one province, under the present rules, not being accepted in an other province?—A. I have had no experience of that.

Q. Do you consider that the amount of coal locked up on sidings could be diminished by the use of ropeways?—A. Yes, to a certain extent, but there would always have to be sidings. We have collieries where there are four or five sidings, and have to load one or two wagons at each siding. I think it would be a good suggestion to concentrate loading at one siding and save the coal locked up under the others. The railway company acquire land before putting a siding down and they will not relinquish it, as they want the land for their own purposes to carry the line through to some colliery outside. I know of such cases. There is one very small colliery in Jherria where there are 3 million tons locked up on account of restricted working, and another 2 millions in my own colliery, making a total of 5 millions, and another 3 millions in a third colliery, making 8 millions in three collieries practically adjacent to each other.

Q. You suggest the colliery giving security to the railway company against damage by subsidence to rolling stock; you would also make them give security against killing a driver or a guard?—A. Yes, we would have to do that. Even at present the railway company hold us responsible for any derailment on a siding, and there have been quite a number of cases where the collieries have had to pay for damage to rolling stock, so the liability in regard to guarantee would not be increased in any way.

Q. There are other ways of doing it than that perhaps?—A. (No answer.)

Hon'ble Pandit M. M. Malaviya.—Q. With reference to your answer regarding cost of night schools, have English labourers, before they go to work in factories, received an elementary education at the cost of the State?—A. They have all received an elementary education at first at the cost of the State but no technical instruction.

Q. You are aware that there is free and compulsory education provided in England for every boy and girl, at the cost of the State, and you think, therefore, that in India also every boy and girl should receive elementary education at the cost of the State?—A. I do.

Hon'ble Sir F. H. Stewart.—*Q.* Your proposal of the division of the day into two shifts, would that upset the labour?—*A.* It might at first, but my object is to get labour working with some sort of system. At present there is no system at all. They come and go when they like; they are very casual and very independent.

Q. Has it been tried anywhere?—*A.* No; I don't think so. I don't think it can be done by voluntary effort. None of the collieries has sufficient labour and go hunting for labour, and unless the colliery managers and labourers are loyal to each other, it cannot be done.

Q. Do you settle your labour on your own land?—*A.* Yes, we have a certain proportion settled on our own lands. We do what we can in that direction. But there are many collieries who have nothing to do with the surface rights, and ordinary raiyats live on the colliery property.

Q. With the result that labour is gradually getting more settled?—*A.* To a certain extent. There are, however, many difficulties in the way. Most of these lands are owned and cultivated by villagers who live on colliery property, but do not work in the mines. That is one difficulty.

Q. If you can settle your labourers on your own land, they would be much less likely to go over to a neighbouring colliery?—*A.* Yes, we have quite a lot, but nothing sufficient for our requirements.

Hon'ble Sir Fazulbhoy Currimbhoy.—*Q.* How many hours do these labourers work?—*A.* The miners who go down the pits come about 6, 7 and 8 o'clock; in fact they come all day long. I don't think the miner works actually 3 hours a day at the face. He goes down the pit, sits at the bottom of the shaft, has a smoke, talks, and goes to sleep, gets up and works when he likes and comes out of the pit up to 8 o'clock at night.

Q. What is their income generally per month?—*A.* We generally pay 6 annas a tub and a miner fills one or two tubs a day, he and his wife and family. There is no reason why a man should not fill three tubs.

Q. I suppose he gets more than he can spend, and therefore he wants leisure?—*A.* Yes, that is one of the reasons. He does not require to work very hard. None of them work the full week, three or four days are quite enough for them.

Q.—How does he spend his earnings?—They spend a lot of time out of the mine; probably they go back to the village for a fortnight or three weeks or a month.

Q. Are they cultivators too at the same time?—*A.* Practically all of them are.

Dr. E. Hopkinson.—*Q.* Will you refer to the para. about mechanical engineers in your written statement? The first part relates to the working of steam boilers and prime movers. Then you go on to suggest that there should be a standard mechanical engineer's examination for all kinds of engineers, whether they are engaged upon steam boilers, prime movers or as mill engineers?—*A.* Where they are placed in general charge of machinery, but I don't mean in direct charge, such as engine drivers.

Q. And you suggest a standard mechanical engineer's examination throughout India. Do you mean an examination by Government which would carry the grant of a certificate or diploma to those who pass it?—*A.* Yes, similar to a ship captain's certificate or a colliery manager's, showing that he is capable of taking up such duties.

Q. Some of those certificates go much further; they mean that a man is not to engage in such duties unless he holds a certificate. You don't mean that?—*A.* Yes, I do.

Q. You mean that a man may not be employed as an engineer until he holds a certificate; do you think that is feasible?—*A.* A man at present is not allowed to be engaged as colliery manager until he has gone through a training and got a certificate.

Q. Do you think that could be extended to all engineering work?—*A.* I think it ought to be. I think it would certainly raise the standard.

Q. You mention a particular instance, *viz.*, electrical engineering work?—*A.* In the collieries the electrical machinery is increasing every day, and it is quite a common practice that the man in charge of the boilers and steam engines also looks after the electrical plant as well.

Q. You think that anyone in charge of electrical machinery ought to be licensed by the Government?—*A.* Certainly, I do.

President.—*Q.* In your written evidence you advocate that Government should appoint "mining experts and others to consider the best and most economical methods of working for the benefit of the country, and report on it." Why don't you put matters of that kind before the Mining and Geological Institute? If a small committee be appointed to go into it, would that not meet your case? You don't want Government to interfere with industries where there are a large number of qualified men carrying on the work?—*A.* That would meet the case.

Q. It is no use our tampering with things for which there is machinery already provided in this country. The Mining and Geological Institute is doing good work, and we want to see that machine turned to account. The same remarks apply to the question of hydraulic packing. The Institute will follow that up in the same way, and the information will get to the right man.—*A.* (No answer.)

WITNESS No. 96.

MR. GULABRAI, *Agent, Benares Bank, Limited, Bhagalpur.*

WRITTEN EVIDENCE.

ital.

Whatever may have been the condition of capital in India some years back, I do not believe in the theory of the habit of hoarding to any great extent in India at present. Capital is no doubt shy, but not because people do not want to take any risk involved in investment in newly starting industries. I am able to say with confidence that people are becoming alive to the advantages, individual and national, which will accrue by the employment of their savings and surplus money in industrial enterprises whose prospects have been established by a thorough and careful examination by experts. The four circumstances that undisputably make the capital shy are :—

- (a) Want of business morality giving rise to bogus concerns intended to cheat the public from their very inception. Such was the case with some banks which resulted in collapse and thus had the effect of retarding the tendency towards greater confidence which was slowly growing.
- (b) Want of experienced entrepreneurs.
- (c) The ignorance of the investors as to the nature and conditions of the business in which they are sinking their capital.
- (d) Almost passive economic attitude of the British Government with respect to the industrial development of the country.

The people are prepared even to ignore circumstance (c) when drawback (b) is removed but condition (d) is the all important consideration.

Capital generally comes from the middle class who are generally educated. The idle and the ignorant rich generally do not contribute. The reason is not far to seek. The unenterprising character of the rich is only too well known to need special mention. They don't want to trouble themselves with anything beyond what conduces to their material comfort and enjoyment. Yet this is the class of persons from which the capital in major part should be derived.

To induce the middle classes to invest their savings in industrial enterprises to a greater degree, we have only to make the circumstances more inviting. We must try to remove the three drawbacks (b, c, d) mentioned above which specially deter the middle class. The circumstance (a) is of course beyond our control, which depends as it does, upon circumstances beyond effective human control. Time will alone remove that defect, as it has done in all industrial countries.

The want of capable entrepreneurs will continue to be felt for some years to come. In this matter the whole blame should not be thrown on the shoulders of Government. The people for a long time did not look upon technical education with favour, partly because of their considering it an undignified profession, partly because of the want of prospects in that line and partly because of the absence of facilities for acquiring that knowledge. But even when they have begun to recognise the importance of this branch of study, they persist in sending the fools of the family for that branch of education. Parents ignore the fact that to make a successful entrepreneur, as much intelligence, knowledge and resourcefulness are necessary as in the acquirement of any branch of knowledge. Then comes in the impatience at having to begin at the lowest rung of the ladder, of our youngmen who after undergoing a course of special education in foreign countries are anxious to embark on industrial careers. This attitude of our young ambitious students is not praiseworthy. They must know that they must establish their reputation for efficiency, resourcefulness, determination and persistence, before they can expect to be placed in responsible posts and before large concerns can be entrusted to their management.

The Government also has to share the blame. It is primarily the function of the State to create such an atmosphere of industrial education as to make good entrepreneurs. In this the Government has done very little, almost nothing. To make successful conductors of industries, we want firstly a diffused knowledge of science, secondly technical schools to increase the skill of our craftsmen to facilitate the work of the entrepreneurs in training the labour, thirdly demonstration factories to bring this knowledge home to the people in a practical and instructive manner; and lastly a widely diffused knowledge of the science of economics to enable our young people to study the forces of demand. In short the Government should make science the "handmaid of industries." Till a scheme for the diffusion of scientific education matures, Government ought to provide a large number of scholarships to enable the best students to acquire scientific and technical knowledge in foreign countries like Japan, America, England, etc. Government also should provide facilities for our young men returning from foreign places after acquiring knowledge, to enable them to have a practical training to make them fit for starting new industries. In fact we want our Government to bestow paternal care upon her almost neglected children.

To remove the obstacle (c) mentioned above, Government should arrange to inform the public through vernacular papers, about the character and prospects of the industry about to be started. Government should also invest its own capital in some proportion to assure the

public of the safety of the enterprise. The advantages of this will be nullified unless Government makes the contribution of at least half the capital by Indians a binding condition. Otherwise the evils arising from investment of foreign capital will continue to remain.

Above all we want Government to relax the rigidity of their almost passive economic attitude towards industrial development of the country. They should conduct a scientific survey of the resources of the country with the help of Indian and European business men; by placing that information of the survey before the people in an instructive manner; by ensuring a demand for the goods produced by giving to the products of indigenous industry their own custom, almost unconditionally, by providing better transport facilities to indigenous products in the form of special commercial rates to enable the undertakers to stand the competition of foreign goods and even by deviating from the strict free trade policy.

To induce the lazy rich to come out with their money we may safely presume that ordinary influence will be of no avail. So Government help is necessary. This help can be rendered, if the Government so desires, firstly by a judicious distribution of honours amongst the persons engaged in commerce and industry in recognition of the services rendered by them in regenerating the industries of India, their mother country, and by the paternal inducement and pressure of the executive officers and their sympathetic encouragement.

Capital can come from the class of the Mahajans and the moneylenders as well. But so long as it is possible to lend money to agriculturists at heavy rates of interest on the security of crops and oftentimes land, few of these Banias will be attracted by the comparatively moderate dividends which modern enterprises in the face of keen competition can offer. These people will be compelled to divert their capital to industries, as the perfection of the co-operative credit movement is bound in course of time to lower the rate of interest all over the country.

The wealth of the villages which is now so largely and wastefully employed in useless festivities, grand funeral ceremonies and litigation, can also be diverted to industrial enterprise in cottage industries, by giving the masses free and compulsory primary education which is sure to exercise an elevating influence upon them.

Industries on a large scale should receive either money grants-in-aid or bounties and subsidies. Premiums can be graded at will in such a manner as to protect those producers that most need protection and not the others. This system does not purport to be anything else than what it really is, namely a "sacrifice imposed upon the nation for reasons of public utility." The public knows that it is paying for this protection and knows exactly what it pays. The special advantage of this system is that the prices will not go high. But there is one serious danger arising from such a system which we should take particular care to remove. The authorities in charge of the disbursement of premiums, should not only be highly experienced in the intricacies of business, but also known for integrity and impartiality to avoid the possibility of the danger of favoritism coming into play, causing serious damage to some industries and giving unfair advantage to others.

I am not in favour of guaranteed dividends for a limited period. The same evils which appeared in the guaranteed railway system may be expected to re-appear. The promoters of industry will be relieved of all the responsibility and incentive to economy save that supplied by the prospect of an eventual share of surplus profits, in excess of the guaranteed interest. No doubt controlling officers will be appointed and a system of audit will be introduced, but there are the dangers of the officers turning out inexperienced and audit being defective. These two defects presented themselves under the guaranteed railway system. The guarantee system is bound moreover to invite foreign capital, only to exploit our country the more.

Loans may be granted in the case of circulating capital but not in the case of fixed capital. As far as possible we must avoid long period loans. I prefer Government's investing some proportion of capital in the industries as loans to the companies with or without interest.

The system of supply of machinery on the hire purchase system should not be resorted to. This will only give advantage to the individual manufacturer at the cost of the public money. It is only human nature not to take care of the things belonging to others when taken on hire and to make the most of them. However, this may be resorted to in the case of cottage industries through co-operative societies of artisans. These industries can be revived and improved to suit the public taste by providing them with up-to-date machinery and implements and loans at first without interest and afterwards with reasonable interest.

It is only proper and just for a Government calling itself paternal to ensure the sales of a commodity when the industry is in the infant stage. It is only gradually that a factory can produce a particular commodity to suit the taste of the public. It is therefore necessary that provision should be made for the consumption of its articles produced in the beginning. This system appears to be the best of all systems. This is the system least liable to remove the necessary everlasting incentive to arrive at efficiency, for there will always be present the danger of the custom being snatched away, if no attempt is made to improve the outturn and to produce it cheaply. The failure of the swadeshi movement in India is well known. The promoters of the newly started industries relied too much upon the spirit of sacrifice and patriotism which the swadeshi movement gave rise to, and believed it to be permanent with a result that the industries suddenly collapsed. It was not surprising news to those who were cognizant of the fact of poverty and the lack of the spirit of nationality in India and knew for certain that this sacrifice on the part of the public was only temporary.

Government control is necessary in paying guaranteed dividends for a limited period, in the supply of machinery on the hire purchase system and in providing a part of the share capital.

Pioneer factories.

The scheme of pioneering industries should not be resorted to by Government. I consider this as beyond the functions of the State, for it will increase the work of the already overburdened Government and result in inefficiency owing to the diffused attention that the Government will pay. Moreover such a system is undesirable because it is bound to undermine the initiative of the people.

Financing agencies.

Financing of industries by the existing joint-stock banks does not at first look practicable. There is enough of capital with the joint-stock banks to help industries, but they cannot take upon themselves that element of risk which the present system of banking involves in lending for long periods. The joint-stock banks can lend capital for short periods only, i.e., the banks can lend to overcome difficulties arising from a deficiency of circulating capital. Under certain arrangements the banks can lend for fixed capital as well. If Government can guarantee to help banks in times of distress, to the extent to which they have invested in industries, I do not see any reason why the banks should object to lend from the reserve fund. The bankers should be only too glad to lend, for their reserves which otherwise remain idle will yield an income. This system has its limits. It can be utilised only for industries which are already established and are capable of expansion, but cannot expand for want of capital, or for industries the prospects of the success of which are almost certain.

A better method of financing industries is to start new industrial banks on the lines on which similar banks exist in Japan and Germany. The capital of such banks may be raised either by one of two methods suggested below or by a combination of both methods in one. The first method is to issue shares like the present joint-stock banks. To make these banks free from periodical crises, in times of panic, it is necessary that deposits should not be accepted.

This method perhaps will not secure investment of requisite capital because of the remote prospects of profits which it will hold out to the investors.

The second method is to provide capital by raising public loans on lines similar to those on which other public loans are raised by the Government. The joint-stock banks will only be too glad to contribute their quota. It is possible that the appeal of the Government may not bring forth the amount needed. But this repulse should not discourage the Government, for in that case the Government can avail itself of an external issue of capital.

With this arrangement capital can be provided at the cheapest rate without the dangers arising from periodical crises. As soon as a particular industry begins to pay, the promoters of that industry may be called upon to issue shares to the extent of the loans which they received from the industrial bank and sell to the Indian public mainly. The amount so realised may be utilised by the Government either in discharge of the public debt or in fostering new industries.

We must be very particular to see that such a system does not eventually become reduced to the system of investment of foreign capital in India.

The third method is to raise capital for the industrial bank, partly by issue of shares and partly by raising a public loan like the Industrial Bank of Japan.

The success of this bank will entirely depend upon the agency employed to conduct the business of the bank. The directors of these banks must be men of business experience and nobody else. The banks should be equipped with an up-to-date information department and a highly technical staff who can critically examine the industrial possibilities of working the concern on sound lines.

Co-operative societies.

Producers' co-operative societies should be encouraged to develop cottage industries in which little capital is needed and where efficiency depends largely on the application and care of the individual workmen, like basket making, shirt making, embroidery, carpentry, manufacturing of cot tapes, durries, napkins, towels, handkerchiefs, carpet and blanket industries, rope manufacturing, etc. This will provide work specially for women who cannot go out of their homes, partly because of the purdah and caste systems which forbid them from entering factory life, and partly because they are the householders and cannot leave their houses. Such societies should not be merely lending societies. Co-operative purchase and co-operative sale of goods should also be the functions of such societies. In fact these societies in the beginning should provide all the requisites for a particular industry. The aim of these societies should be the gradual disappearance of the employer by transferring all the stock of an enterprise to the labourers themselves, and the introduction of new methods to improve the quality and increase the output of the goods, and supply of easy credit. Care should be taken to avoid the tendency to re-establish the very institutions which they seek to eliminate, by refusing to admit new members and engaging hired workmen, thus turning the societies into joint-stock companies.

Here I might mention that the bafta industry at Nathnagar in Bhagalpur District is in need of co-operative producers' societies. The condition of the labourers can be improved by excluding the Mahajan who generally provides them with all the requisites of the industry on condition that the goods so produced will be sold to them oftentimes at lower than market rates. It is a known fact that these Mahajans exploit the labourer's necessity and

his want of forethought, weakness, and ignorance. The industry admits of improvement and is capable of extension by introduction of new methods in the handlooms.

ORAL EVIDENCE, 1ST DECEMBER, 1916.

Mr. C. E. Low.—*Q.* How long have you been an employé of the Benares Bank?—*A.* Eight years. Two years I was in Muzaffarpur and six years in Bhagalpur.

Q. What previous training had you in banking before you were employed by the Benares Bank?—*A.* I was doing commercial agent's business in Bombay for about six years, that is, export and import business of my own.

Q. Had you any educational or commercial training?—*A.* I have passed the Public Service examination which we had some ten years ago in Sind. The Government has discontinued that examination.

Q. On what do you advance money in Bhagalpur?—*A.* Bills of exchange, and loans on guilt-edged securities and other marketable securities.

Q. You advance loans on produce?—*A.* We have not got that system. People can get money on personal credit, but they do not keep the produce with us.

Q. Suppose a man has 1,000 maunds of rice which he wants to send to Calcutta, do you finance that?—*A.* They bring the railway receipt to us and we advance money on the security of the railway receipt and forward the receipt to the agency here.

Q. Have you any factory in Bhagalpur?—*A.* No.

Q. No sugar mills, or jute presses?—*A.* Handlooms in tusser.

Q. You obtain your funds mostly from deposits or share capital?—*A.* From deposits.

Q. You do not lend much money on landed property?—*A.* Very seldom. We used to do it, but since the 1913 crisis we have stopped.

Q. But you can advance up to the extent of your share capital?—*A.* That depends upon circumstances and time.

Q. Hon'ble Sir F. H. Stewart.—I do not understand your proposal of financing industries. Do you mean that Government should start an industrial bank?—*A.* Yes. It should be like the joint stock companies and shares should be issued.

Q. It is to be a private enterprise without Government aid?—*A.* No.

Q. You say a second method is to provide capital by raising public loans on lines similar to those on which other public loans are raised by the Government. You say that the Government should say that they are going to finance such and such an industry and raise the loan for that specific purpose?—*A.* If we are not able to get shares taken up in the market, in that case Government should raise a public loan.

Q. Hon'ble Sir Fazulbhoy Currimbhoy.—Who are the promoters of your Bank?—*A.* The Benares people.

Q. And you are the agent there?—*A.* Yes.

Q. Do you get remuneration or agency commission?—*A.* Remuneration.

Q. And your experience in banking has been only for eight years?—*A.* Yes, in this bank.

Q. Before that you had no banking experience?—*A.* No.

Q. And it is only like a shroff's business, lending money on properties?—*A.* There is actual banking to help business.

Q. Industries?—*A.* Up till now we have not been able to do help to industries, because there has been no call on us for there are no industries in Bhagalpur. We only lend to merchants.

Q. You take hundis?—*A.* Yes.

Q. Do you think that people will subscribe to an industrial bank? What is your experience as banking agent?—*A.* If we get good experts and people are made to understand the object of it I am sure.

Q. Experts in what?—*A.* In banking business.

Q. And they must come to the industries without knowing whether the industries are good or bad and without having any knowledge of technical or other things?—*A.* We have got in Karachi the Hon'ble Mr. Webb who has started a railway. The people were quite ignorant of the line of business he was going to start, but because the people had confidence in the person they subscribed capital.

Hon'ble Sir R. N. Mookerjee.—*Q.* You say, "I am not in favour of guaranteed dividends for a limited period. The same evils which appeared in the guaranteed railway system may be expected to re-appear." What are the evils of guaranteed railway system?—*A.* It is only a known fact that we have no guaranteed railways who pay dividends as much as other railways pay.

Q. That is your experience?—*A.* I have heard. I do not know of any guaranteed railway paying $7\frac{1}{2}$ per cent. as many private concerns do.

Q. The guaranteed railway pays 8 per cent.?—*A.* Of what standing? The more time a concern takes the better the result.

Dr. E. Hopkinson.—*Q.* You say, "A better method of financing industries is to start new industrial banks on the lines on which similar banks exist in Japan and Germany." Can you tell us very briefly what those lines are in Germany?—*A.* The major portion of the share capital is subscribed by Government.

Q. You know that?—*A.* I have read it. One does not expect to go and inquire about these things there.

WITNESS No. 97.

*A. M.
hoon.*

MR. A. M. ARATHOON, *Shellac Manufacturer, Jhalda, Manbhum District.*

WRITTEN EVIDENCE.

ndustry.

My experience of Indian industries is confined to the lac industry and my experience or opinion may be useful in this connection only.

The lac industry generally, from the cultivation of lac trees to the manufacture of shellac, is carried on by primitive methods and Government could greatly help the industry if the industry is investigated with a view to the increase and improvement of the cultivation and propagation of lac insects and the collection of lac incrustation on scientific lines. The methods now used are extremely careless and imperfect and often wasteful and a special study should be made with a view to the improvement of the method as with the present method there is considerable wastage of material and labour.

It would further be for the interest of this country generally and of the lac industry particularly if the export of the crude or unmanufactured lac to foreign countries in the form of raw or seed lac were prohibited or restricted.

The only financial help which Government could give the industry with advantage is to aid cultivators of lac in times of distress or when there is locally scarcity of lac insects for inoculation of trees to obtain lac insects from elsewhere by advancing them small loans on nominal interest.

The lac industry could greatly be improved if the researches were made by Government and scientific aid provided, *e.g.*, a good deal of useless labour and wastings could be avoided by the introduction of scientific methods for crushing, washing, extracting more shellac from the raw stuff than is done at present and this can only be effected by expert scientific methods; in my opinion the lac industry is the only important industry which is least studied. There is room for considerable improvement both in quantity and quality and the doing away of the present laborious methods.

The lac dye industry should be revived and this could easily be done by using certain chemical process and foreign dyes could easily be ousted from the market. More facilities should be given for the transit of shellac on Indian railways; the present slow transit is often the cause of deterioration of shellac, specially in the hot weather.

ORAL EVIDENCE, 1ST DECEMBER 1916.

President.—*Q.* You have been engaged in the shellac manufacture for a long time?—*A.* Yes, I have been about 23 years in shellac.

Q. Have you had any previous technical training for that work?—*A.* No, just a practical knowledge.

Q. You say that "The lac industry generally, from the cultivation of lac trees to the manufacture of shellac, is carried on by primitive methods and Government could greatly help the industry if the industry is investigated with a view to the increase and improvement of the cultivation and propagation of lac insects, and the collection of lac incrustation on scientific lines." Have you read the report written by Mr. Misra of the Agricultural Research Institute at Pusa?—*A.* No, I have read Watt's book.

Q. This is very ancient. The last report by Mr. Misra was in 1913, since supplemented by another note. Why have you not got into touch with people who are actually doing this work?—*A.* I have not had occasion. I did write to Pusa for some information, but it was not very much.

Q. You have not seen bulletin 28?—*A.* No, I have not.

Q. Surely if you keep up-to-date with your work you must recognise the existence of literature of this sort. You have advocated what is already being done by Government. You did not ask them at Pusa if they had published anything on the subject?—*A.* No, I did not.

Q. Write for bulletin 28 and get into touch with Mr. C. S. Misra, and you will find him very willing to help you?—*A.* Thank you.

Mr. C. E. Low.—*Q.* Have you had any idea of growing lac? You wanted to grow lac on some trees you had. What kind of trees?—*A.* All sorts, Kusum and Palas. These were trees I grew myself in my own compound.

Q. A miscellaneous lot of trees growing in your own compound on which you proposed to grow lac, as an experimental or commercial proposition?—A. It was experimental, but it would be commercial if successful.

Q. You can take it from me that it is not a commercial proposition to grow lac on a small number of different varieties of trees; it would be better to keep to one kind of tree and grow one kind of lac?—A. It grows in the same way on all trees. Palas and Kusum are different. There are two kinds of lac.

Q. Merely for growing lac I would suggest that you might have got hold of an ordinary cooly from the lac district, who would have shown you how to do it at once, and after doing that you might have found the information which Pusa could have given you much more valuable than if you had had no practical experience at all. You purchase lac from up-country merchants?—A. Yes.

Q. From what parts of India?—A. In the district.

Q. What process do you manufacture lac by? Do you use alcohol?—A. I don't.

Q. You mean you heat the lac and squeeze it out?—A. Yes.

Q. Then you sell to Calcutta?—A. Yes, the whole thing is sold to shippers.

WITNESS No. 98.

MR. J. M. CASEY, *Planter and Managing Proprietor, Nildongri Sisal Hemp Estate, Sambalpur.* Mr. J. M. Casey

WRITTEN EVIDENCE.

Notes with regard to sisal hemp industry in Bihar and Orissa.

The sisal hemp industry is an old established one in Yucatan, Mexico. Attempts have been made to grow it successfully in India, principally in Assam, but with little result for numerous reasons, chiefly climatic.

This estate was started by me in 1904, with plants procured from Sylhet. The first few Nildongri sisal years, progress was very slow indeed, owing, firstly, to the want of experience; secondly, to the plants not being acclimatized to this part of the country (the death-rate being as much as 40 per cent. during the first few years), and lastly, to the lack of funds.

But, as my experience of the plant, and its treatment increased, and I started planting on a larger scale, and with my own acclimatized suckers, the result has been vastly different.

I have now 545 acres under sisal, much of which, though, is not yet in bearing. My crop for the past season, 1915-1916, amounted to 1,000 maunds, and was sold locally at fair prices.

At the beginning of last season, a sample of hemp from this estate was sent to Messrs. Ide & Christie of London for report and valuation. They classed it as first class sisal, commenting favourably on its colour, strength and preparation, and valuing it at £39—40 per ton, which was the rate prevailing at the time for first class sisal hemp.

From the hemp statistics up to 1914, the latest in my possession, the world's shipments of sisal hemp rose from 611,939 bales in 1903 to 982,000 bales in 1914. German East Africa alone shows a rise from 4,828 tons in 1909 to 19,814 tons in 1913.

I am of opinion that this industry could be greatly extended in these parts, as my experience of the past twelve years has proved that the climate, soil, and the lie of the land generally, are all favourable to the cultivation of sisal.

Q. 41.—The land tenure in this district is not encouraging enough to entice capitalists and others to invest their moneys in industrial undertakings; for according to the regulations of this district, owners of village lands have not the right to dispose of such, and it is risky negotiating for even a lease of such lands, as it is most difficult to find out what actual rights the owners hold. There is not much land held directly by Government, and the bulk of it is under Government Forest, and from my experience Government land is not easy to obtain.

Q. 42.—I would suggest that Government should give concessions of land on the following terms to encourage the establishment of new industries, which have in them a likelihood of success:—

- (1) A lease of not less than 30 years, with the option of a renewal of the lease.
- (2) That the land be leased free of rent for the first four years. Rent thereafter to be charged at the rate paid for land of similar quality in adjoining villages.
- (3) Should the land thus conceded contain forest of any value, such forest be disposed of to the lessee at a nominal valuation.
- (4) That the lessee be given the right of transfer of his rights and interests in the property.
- (5) In the case of land taken up for cultivation of Sisal from zemindaries and villages, Government should acknowledge and guarantee the lessee's rights in such lands.

Q. 5.—I consider it would encourage and considerably help new industries, such as the one in question, if Government were to supply machinery and plant on the hire-purchase system, as the machinery and plant required for a sisal hemp plantation are expensive items.

It would certainly be very helpful if Government would guarantee the purchase of crops on a fair valuation, until such industries were well established.

Q. 97.—With regard to transport facilities in this district, the roads are few, and most of these are but village tracts. I would recommend that the existing roads be put into proper repair and that new roads be opened to facilitate industrial development, and in the opening out of the country generally.

way freights.

Q. 98.—In reference to railway freights, my experience is that railways are not too much inclined to foster new industries by grants of special concessions, and I would suggest that railway companies be induced to grant special rates for the carriage of produce and material of new industries, as is generally done in other countries.

competition.

Q. 109.—There is a lot of inferior fibre, commonly known as aloe fibre, manufactured in Indian jails, from other varieties of the agave, and this is bought up in small lots by petty traders, then bulked and sold under the head of Indian sisal, which naturally does the sisal industry no good, the result being, that the real Indian sisal placed in the home market, is considered inferior to that produced in other countries.

ial organisation.

Q. 60.—I am of opinion that there should be a Director of Industries and that he should be a sound business man.

ORAL EVIDENCE, 1ST DECEMBER 1916.

Mr. C. E. Low.—Q. How did you get possession of this area in the Sambalpur District ?
—A. Through Government, from the Forest Department. It was originally forest reserve. I got it on a 30 years' lease.

Q. On what terms ?—A. The ordinary terms payable for village lands in the adjoining villages.

Q. Did you get it rent-free for any period ?—A. For four years.

Q. What decorticating plant do you use ?—A. American. This has a capacity of 3,500 leaves per hour.

Q. What power do you use ?—A. 12 H. P.

Q. What percentage do your leaves give ?—A. At the present moment it is not a very fair test, because we are really dealing with a good bulk of leaves not fully grown. Last season we got 30 lbs. of fibre per thousand leaves, that is with the ordinary leaf we manufacture every day ; for picked leaves, 56 lbs. per thousand leaves.

Q. Have your plants come into full bearing as yet ?—A. Some of the earlier areas are all in bearing, but the area being small the outturn is small as compared to what it should be.

Q. Is your full area under sisal at present ?—A. No, I have still got about 150 acres to plant.

Q. Did you have any difficulty with working the decorticator at first ?—A. No, I started off first with two raspadors of the kind which they use in Yucatan, and last season I got in an American machine which is automatic.

Q. You don't have to handle the leaves ?—A. You just slip the leaves in, these are gripped between two chains and carried forward, and the fibre is delivered on an endless chain.

Q. What is the name of it ?—A. By the Prieto Machine Co. They are the largest manufacturers for Yucatan.

Q. You never tried any of the German machine ? By Krupp of Magdeburg ?—A. I have not tried it but know something about it, styled the New Corona.

Q. Did you see them in the Allahabad Exhibition ?—A. No, there were two in Sylhet.

Q. Can you see your way now to satisfactory profit out of your area ?—A. Yes.

Q. You state, "it is most difficult to find out what actual rights the owners hold." Why do you say that ?—A. Our district is a peculiar district. It belongs to Bihar and Orissa and yet is not worked in the same way as other districts of Bihar and Orissa. It was taken over from the Central Provinces, and the rules and regulations in the district are those that are now used in the Central Provinces.

Q. Are you not aware that village patwaris maintain a record-of-rights, which is kept up-to-date, or use to be in the Central Provinces ?—A. No.

Q. You have never inspected the village papers ?—A. No, I have not seen any village papers.

Q. Perhaps you are speaking without the book ?—A. I have tried for village land, and have been advised not to touch it by legal people.

Q. That is because of the difficulty of acquiring the right, not the difficulty of ascertaining the right ?—A. I don't know what it is, but there are so many shareholders.

Q. The proprietary right can always be ascertained on application to the officer of the tahsil, and any charges on this can always be ascertained on application to the Registration Office. Tenancy rights can be seen by inspection of the village papers ?—A. Then again the

objection to village land is that it is generally all rice land, and rice land is not suitable for our cultivation. We want high land. I have some photos here. It is more *dongri* land that we want.

Q. Did you find any difficulty in marketing your fibre?—A. Not at home; but out here they don't seem to quite understand it.

Q. You did not think of communicating either with the Commercial Branch of the Board of Trade in England, or the Director of Commercial Intelligence here?—A. No.

Q. You did not try to get some firm at home to authorize some firm of shippers to deal with you?—A. The firm here sent to their recognised brokers at home.

Q. Did you discover whether there was any high proportion of lime in the soil?—A. I have not had it analysed, but I should say there was a very great proportion of lime.

Q. You speak of the terms on which you think Government should give land concessions for new industries. Your fourth suggestion is that "the lessee be given the right of transfer of his rights and interests in the property." You don't speak about any of the obligations which should attach to it. A man could get his land, according to your proposal for 4 years, and then sell it without doing anything on it, except grazing cows on it, for instance?—A. Government would put their own stipulations in such a case, and thus protect themselves.

Q. Did you require any outside help in the matter of financing and starting this industry?—A. Yes, latterly.

Q. Did you find difficulty in getting it?—A. Yes.

Q. Did you try any bank?—A. No, I never tried banks.

Q. There is no local bank at Sambalpur?—A. There are a few local Marwaris.

Q. I mean ordinary banks?—A. No, I don't think they do that business.

Q. You speak of this fibre being extracted in Indian jails? Is any of that exported?—A. It goes down to Bombay and is sold as Bombay alooe fibre. I heard it was also sold in Calcutta as Indian sisal.

Hon'ble Pandit M. M. Malaviya.—Q. What is the difficulty in obtaining land; is it that other crops are more useful?—A. They don't seem to be willing to part with their land. I cannot arrive at a proper reason.

Q. But they are cultivating the lands?—A. No, there are many villages with more land out of cultivation than under cultivation.

Q. Is there a large area of waste land?—A. Yes, but that sort of waste land would not be suitable for our cultivation.

Q. Then land suitable for your cultivation is not lying fallow?—A. The bulk of suitable land is under Government forest.

Q. Apart from Government forest, there is no other land suitable for your cultivation which is lying fallow?—A. There may be in zamindaries and other parts of the district which I have not visited.

Q. So far as you are aware, there is not much land lying fallow suitable for your purpose?—A. No. Another thing is, out of much of that suitable land, Government has, within the last three or four years, reserved some thirty thousand acres and put it into the forest.

Q. That is perhaps because the Government consider that it would be more valuable than leasing it to you?—A. I never asked for it. I say, in the case of extending the industry, those would be suitable places of course.

Q. Then your suggestion comes to this, that instead of putting in so much land under reserved forest, the Government should lease out some portions?—A. Yes, to form a nucleus.

Q. Would that not be determined by the consideration whether it would be more profitable for Government to reserve it for forest than to lease it to you?—A. From a commercial point of view I don't think the Sambalpur forests are very valuable; the timber raised on these forests is not very valuable.

Mr. C. E. Low.—Q. Would it be more correct to say that on the land you want, there is scrub jungle, etc., of no value?—A. We don't want level land; it is rocky hills that we look out for most; well-drained soil.

Hon'ble Sir F. H. Stewart.—Q. Would most of your hemp be for export?—A. Yes, the bulk of it.

Q. And your principal competitors would have been German East Africa and Mexico?—A. Yes, but the bulk of the outturn of Yucatan remains in New York and does not leave America.

Q. Then you think that you could compete fairly satisfactorily?—A. Very satisfactorily, because our other conditions are favourable; for instance, labour and other conditions.

Q. You have had no experience of trying to grow sisal hemp in other parts of India?—A. No, but I have been to Sylhet and seen the plantations up there.

Q. They are not successful?—A. No, they get all sorts of blight, and are not satisfactory. I think there is too much moisture there. It is a plant that requires a dry, arid country.

Q. This inferior fibre, is that grown now to the detriment of your better article?—A. I could not say that.

Q. There are people at home who know all about this fibre, and are accustomed to dealing with it?—A. Yes, in London.

Q. Calcutta would be the normal port for you to ship through?—A. Yes, we are about 300 miles from Calcutta.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. What climatic conditions are needed for this industry?—A. A very dry, arid climate.

Mr. C. E. Low.—Q. Not in the rains?—A. We had 62 or 64 inches this year, but so long as you have it on these dungries and steep lands it is safe, as you have well-drained soil.—A. The conditions in Yucatan are much akin to what we have in the Central Provinces.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. Do you think this is the only part of India where it can be grown?—A. No, I would not say it is the only part, but the Central Provinces generally is suitable.

Sir D. J. Tata.—Q. Where did you first gain your knowledge or experience of this industry?—A. Mostly from books. I had a little experience in Sylhet for a fortnight, and talked with people who had been in this industry, but it was mostly practical experience which I had developed myself.

Q. What induced you to go in for this particular business?—A. I had been reading about this industry for two or three years.

Q. You have no knowledge of Yucatan, except from books?—A. No, but it struck me that this particular district corresponded to the Yucatan conditions.

Q. With regard to fibre, you acquired all your knowledge from books?—A. Yes, and practical knowledge.

Q. Have you made a thorough study of the question and read up everything possible on the subject?—A. Yes, I have been at it for 12 years.

Q. Is there any literature extant?—A. There is the Kew bulletin which gives lots of information about it, and there are pamphlets issued by the Manila Government. They grow it in Hawaii.

Q. That is with regard to cultivation, but with regard to the manipulation of the fibre?—A. It is in the same work; the Kew bulletin gives a lot of information about it.

Q. You have had no opportunity of consulting an expert on the subject?—A. No, there is none in India.

Q. But out of India?—A. I was thinking of visiting other plantations out of India, and comparing notes with the plantations there.

Q. With reference to machinery, you selected this particular one because it was well spoken of; you did not try to see other machinery?—A. I had seen Todds, and two or three other machines working, but found there were little hitches here and there. I thought I would like this one, especially as I had a small engine and boiler. The conditions more or less suited me with this machine, as my area was small.

Q. My object in asking you was to know whether you had made a particular study of the machine?—A. No, but I had been studying this question for 12 years.

Mr. C. E. Low.—Q. Had you any experience as a mechanical engineer?—A. I served my time as a civil engineer.

Mr. A. Chatterton.—Q. Can you tell us how much per acre it would cost to bring a Sisal hemp plantation into bearing; what would be the amount of capital required?—A. Including machinery and everything, Rs. 225 per acre.

Q. In how many years would your plants begin to yield?—A. They generally yield in 4 years. My unacclimatised plants did not, but with my acclimatised plants I did it in four years.

Q. After the plant has grown up, and you begin cutting the leaves, as far as your experience goes, have you had any difficulty with premature poling?—A. No, we have got plants that are down 15 years, but they were big plants 3 or 4 years old when put down which I got from the Botanical Garden, Sibpur. They have not poled yet.

Q. Have you been cutting the leaves?—A. Yes, regularly.

Q. Have you found that cutting the leaves tends to induce premature poling?—A. I cannot say; my experience is not long enough.

Q. Of the earlier plants which you have now been cutting, what percentage have poled?—A. I have planted out seven lakhs of plants at different periods within the 12 years, and this year the number of poles is 1,850 out of seven lacs.

Q. You say you got about 30lbs. of fibre?—A. Yes, from leaves big and small combined, but if I select the leaves I get 56 lbs. to the thousand leaves.

Q. Have you any special arrangement for transporting leaves?—A. By carts.

Q. How far apart do you plant them?—A. I started with 10 by 5; now I have narrowed it to 8 by 4. I get about 1,400 plants to the acre.

Q. Do the plants in Sambalpur stool freely?—A. Yes, after the second or third year. Besides planting out this area (I originally started the plantation with 55,000 plants), I have disposed of about 3 lakhs outside and planted out 7 lakhs of my own from these 55,000 in 12 years, all from suckers. I have a few bulbils, but I cut the poles out as soon as they appear, so as to get a full crop of leaves for that year.

Q. How many leaves did you calculate to get from each plant?—A. About 30 leaves per plant per year. We ought to go on for about six to eight years.

Q. What arrangements do you make for replacing the old plants?—A. Interlining 5 years after the original ones have been put out. In the centre of the 8 feet space I run in another time.

Q. What do you do with all the pulp from the machine?—A. I use it as manure and return it to the soil where the soil has a tendency to be poor.

Q. You have no experience of working with Todd's machine?—A. No, but a good machine is the one made by Robey of Lincoln, which is supposed to be the machine.

Q. What do you consider is the minimum area, or the most suitable area for this industry?—A. 500 acres.

Q. How much of that would you plant out?—A. The whole area; then you would want a few hundred acres for fuel, and for your labour force, etc.

Q. And for extracting the fibre do you want a large quantity of water?—A. Not very large; I turn out about ten maunds of fibre per day, and I don't think I use more than about 8,000 gallons of water which is supplied by a tank.

Q. You suggest in your note that it "would certainly be very helpful if Government would guarantee the purchase of crops on a fair valuation, until such industries were well established." Do you have any difficulty in selling your crop?—A. I had at the start, but not now, as prices have gone up and there is a good demand for it.

Q. I presume your difficulties were due to the small quantities you were offering. Do you sell through brokers?—A. I sell through agents in Calcutta.

Q. Is it a fact that you can send your crop to London brokers, and they would sell the whole lot for you?—A. You would have to employ somebody in Calcutta to do your business for you, and you would practically require agents there.

I suppose you would now withdraw that statement, do you think Government should guarantee the purchase or guarantee that they should be sold? There is a lot of this fibre used in Government works, and it might be helpful if Government consumed it in the country.

Q. To what purpose?—A. For shipping generally.

Q. Do you know of any other use it is put to; except making ropes?—A. A lot is made into nets for trawlers, both in Japan and in England, as it makes very good nets, and they are now, I believe, putting it to many of the uses to which they formerly put flax. As the North of France and Belgium, and parts of Russia have gone out of cultivation, they are substituting this for flax for many of the coarser works. It is used largely in self-binder harvesting machines in Canada, Australia and also in brush manufacture.

Q. Are you getting a better price now for your fibre than before the war began?—A. About double the price. I sell in Calcutta outright, because it is difficult to get freight, and you don't know when you may get it.

Q. What is the quality of the land on which you grow this fibre?—A. Poor land; what would be useless for any other crop, on which they generally grow their *til*. It is even too poor for *til*.

Q. Is your plantation at all patchy?—A. No, it is in one block.

Q. In one part of it does the plant grow two or three times the rate of others?—A. The unacclimatised plants, not the acclimatised ones.

Q. You do not know if lime is an important factor?—A. They say it is necessary to have lime.

Q. Are you supplying these stools or suckers to other plantations?—A. Yes, I supplied a lot to a Native State south of me, but I have not heard what they are doing.

Mr. C. E. Low.—Q. Do you bale?—A. Kutcha bales in 2 maund sizes.

Hon'ble Sir F. H. Stewart.—Had you previous planting experience before you took this fibre?—A. I had been in tea; not working in tea, but I used to live on a tea garden and know a little about tea.

Mr. A. Chatterton.—Q. Would it be possible to have a portable plant so that you can go round and deal with small plantations of 4 or 5 acres. Could you cut your leaves at any time?—A. Only from October to the end of May would be suitable.

Q. You would get a season of 7 months in which to cut leaves?—A. 7 to 8 months.

Q. Would there be any difficulty from the planters' point of view in cutting all the leaves at one time?—A. It would not be good for the plant. It would retard the growth. I work it in cycles and it probably takes me a month to come back to the original place where I started.

Q. Supposing you take a well developed plant and cut off one-third of the leaves in each year, do you think that would have any serious effect on the growth?—A. Yes. It is said to throw it back. In the following year the plant would not have such a good growth. The less shock given to the plant at one time the better.

WITNESS No. 99.

Mr. Chas. Olden. MR. CHAS. OLDEN, Superintendent, the Cape Copper Co., Ltd., Rakha Hill Mines, District Singhbhum, Chota Nagpur.

(NOTE.—Mr. Chas. Olden's written and oral evidence is confidential.)

WITNESS No. 100.

Mr. W. L. Carey Thomson. MR. W. L. CAREY AND MR. W. L. THOMSON, representing the Titaghur Paper Mills Co., Ltd., Calcutta.

(NOTE.—Messrs. W. L. Carey's and Thomson's written and oral evidence is confidential.)

WITNESS No. 101.

Mr. H. W. Carr. MR. H. W. CARR, representing Balmer, Lawrie & Co., Managing Agents, Bengal Paper Mill Co., Ltd., Calcutta.

WRITTEN EVIDENCE.

Manufacture of paper.—The Bengal Paper Mill Co., Ltd., was registered in 1889. Its mill is situated at Raniganj, where Rs. 21,60,000 has been expended on buildings and machinery.

The present output of paper is some 6,600 tons per annum, and although the mill compares in equipment favourably with the ordinary standard of mills in the United Kingdom, the history of the mill for the past several years has revealed a long struggle to pay a moderate dividend on a reduced capital.

The fact that imports of paper amounted to £1,058,454 in 1913, indicates the possibilities for paper mills, but owing to the low prices at which continental papers are placed on the Indian market, the demand for papers made from such materials as are at present in common use, is very restricted, and short of a protective tariff, the two questions in the Commission Schedule which it seems to us chiefly concern the local paper industry, are (7) of question 5 and question 98.

Railway freights.

Dealing with the latter question, railway freights are high in consideration of the value of the products required for paper-making. For instance, the freight on a maund of paper from Hamburg to Raniganj is Re. 0-14-3 while freight on grass from the Nepal fields sufficient to make a maund of paper is Re. 1-5-0 and the collection of waste material in Delhi and Lahore, such as waste paper and rags, incurs freight at the rate of Re. 0-15-9 and Re. 1-2-3 per maund of material respectively. In short, the rate of freight from Hamburg to Raniganj, if applied to the raw material used at Raniganj, would only allow grass to be brought from Chota Nagpur and Sahibgunge districts, but it would not allow waste paper and rags to be brought from any important up-country centre, and would only permit of jute, hemp, etc., being brought from Benares and nearer districts.

Similar difficulties apply to the marketing of the paper itself, as the following characteristic rates of freight indicate :—

					Rs.	As.
From London to Bombay, Madras or Calcutta	.	.	.	.	20	4 per ton.
From Raniganj to Madras :	{	Rail	.	.	25	5 "
	{	Sea	.	.	28	12 "
From Raniganj to Bombay :	{	Rail	.	.	42	5 "
	{	Sea	.	.	30	12 "

It is freight on raw material, however, which is the chief difficulty in the way of local paper competing with the imported article, and which also stands in the way of developing other sources of paper-making material in other parts of the country.

The other question which we refer to as having a considerable bearing on the prosperity of the paper industry is the guaranteed Government purchase of products. The local mills have enjoyed Government support for some considerable time, and it has been so vital to their existence that the risk of losing it has been a check on the production of paper locally. The

guarantee of Government to purchase their paper requirements in India would be an incentive to increase the production, and this, together with special freights on raw material, would be of much value.

Such support, however, would be likely partially to fail in its object, unless something can be done to protect the industry by a tariff against foreign imports of subsidised or dumped supplies, which in some cases have been brought to Calcutta from Sweden at a freight of 3 annas 4 pies per maund; and if the paper industry of India is to grow, we feel strongly that this step will prove necessary. To exemplify its worthiness for protection, the following figures are submitted referring to the 3-machine mill at Raniganj turning out some 6,600 tons of paper per annum :—

	Rs.
Royalties paid on grass	39,000 per annum.
Native wages at Raniganj	1,95,000 "
Native wages in the grassfields	1,50,000 "
Native wages in collection of waste material	50,000 "
Railway freight on raw and finished products	2,25,000 "
Duty on imports	25,000 "
Rosin purchased from Government factory	38,000 "
Coal consumption	45,000 tons.
Labour force employed at mill	1,200 hands.

In addition to the above direction in which the manufacture of paper directly contributes to the prosperity of the country, as opposed to imported supplies, it will be remembered that the industry also has a direct interest in the development of local supplies of caustic bleach china clay, dyes, etc.

To summarise, we submit that while the guaranteed support of Government and reduced railway freights would tend to increase the manufacture of paper, a protective tariff is likely to prove necessary, if the industry is to increase.

(Witness also gave confidential oral evidence.)

WITNESS No. 102.

HON'BLE BABU BHUPENDRA NATH BASU, *Attorney at Law, Calcutta.*

*Hon. Babu
B. N. Basu.*

WRITTEN EVIDENCE.

Financial aid to industrial enterprises.

I have had some experience in raising capital for industrial enterprises. I was instrumental in raising capital for some important indigenous concerns, such as, the Indian Stores, Limited, the Bengal Luxmi Cotton Mills, Limited, the Bengal Hosiery, Limited, the Bengal National Bank, Limited. Capital.

I experienced great difficulty in raising the capital for these concerns : much of it was subscribed through the personal influence of myself and others who took an interest in the concerns. The reason for this difficulty is obvious. The people who have as a rule largely subscribed towards these swadeshi concerns mostly belong to the poorer middle classes of Bengal. Their savings are small and they naturally are unwilling to put these savings into enterprises, which cover new area in the industrial field and the chances of the success of which they are unable to judge by anything they have learnt through education or environment. Among the middle classes, the first concern to a man who begins to earn is to provide a home for his wife and children and if possible, some means of a secure income for them which may be beyond the vicissitudes of industrial or commercial ventures. Government securities, guaranteed or safe railway companies and most important of all landed property, attract the largest part of the savings of the comparatively poor middle classes. Perhaps a fraction of them, the more adventurous, invest in bank shares and shares of joint stock companies of long standing. Coming to the wealthier middle classes, among whom I include the more fortunate section of the professional classes and the more successful businessmen, the investments I have just mentioned appeal to them in a larger degree, specially landed property, which is the safest investment and at the same time gives to the holder a considerable degree of prestige and dignity. They are not attracted by industrial concerns involving a certain amount of risk to their capital so long as there are in Bengal, large landed properties with revenue permanently fixed, available through the necessity or extravagance of their proprietors, as fairly profitable investments either for the purposes of loan or purchase. On the other hand the arid sands of Rajputana offer no inducement to capital and the Marwaree has become a trader by necessity. Coming to the mahajans or professional money lenders they prefer to lend money at high and exorbitant rates of interest on land or produce, which is often placed under their control, rather than risk their capital on industrial concerns with doubtful returns and with a

certain amount of danger to the capital invested. The agriculturist is too much engrossed in his own hard occupation to look beyond the boundaries of his own small holdings.

The middle class young men of Bengal have been impelled by a certain amount of economic necessity to look out for new fields for earning livelihood, but the principal motive for embarking upon industrial ventures during the years following the swadeshi movement was more or less patriotic and sentimental. Sentiment alone cannot lead to industrial success unless it is accompanied by solid knowledge and experience. During the height of the swadeshi movement in Bengal, as regards the various factors of production, it might be emphatically mentioned that there was no lack of capital forthcoming. There was not indeed a sufficient number of people with technical training who could ensure the production of an article with the necessary finish and quality. Even that would not be very difficult to find either in the province or outside. The real stumbling block so far Bengal is concerned arose from the absence of trained business men, men with general common sense, capable of judging industrial possibilities and of adapting the enterprises in their charge to the actual local conditions. Elasticity with regard to our enterprises could only come from men who had been in actual touch with commercial life and had the necessary knowledge and training. The organisation of joint stock enterprise—a new form in this country—requires men who can master on one hand details of work and procedure and who will also understand the responsibility of their work to the public and the shareholders. A good many blunders could have been avoided, several enterprises which have gone into liquidation or are still languishing with feeble life would have proved eminently successful, if we had a larger number of men with the knowledge of the material facts of commercial enterprise and with the power of forming sound business judgments. To a very large extent our present educational system is responsible for this state of affairs.

A very serious difficulty has been created by the fact that the existing system of education, while it has greatly liberalized and stimulated the mind of the country, is far removed from the actual facts of life which young men have to face when they are called upon to do practical work, and the result is generally disappointing. The ideas of ancient scholasticism are more or less the ideals of present day English educationists and they still dominate the systems prevailing in Oxford and Cambridge; and these have been transplanted in India where owing to the speculative genius of the people, it has found a congenial soil. Where practical men are wanted we have been given a race of Pandits, with this difference, that instead of having learnt the ancient literature of their own country, which might be of some use, they have learnt with considerable assiduity numerous facts like the conjugation and declension of Anglo-Saxon verbs before the days of the Norman conquest. It may have its uses but from the standpoint which we are considering at the moment it has not proved very helpful.

Besides the difficulty of capital and the paucity of men with technical and business knowledge there are peculiar difficulties in Bengal with regard to labour. The Bengal peasantry are comparatively prosperous on account of the fertility of the soil, an abundance of rainfall, fixity of tenures and fixity of rent. Bengal labour has to be paid higher than labour from any other parts of the country and even the allurements of higher wages does not always bring the necessary number of Bengali labourers. The Bengali is an extremely intelligent workman, but it is difficult to get him for factory work. He has got his own caste and guild systems and he gets in his own occupation sufficient work for his immediate needs. The attachment of the Bengali rural population to their ancient land which has given them sustenance for many generations is equalled by their aversion to crowded life in unhealthy cities. Real prosperity for industry in Bengal can only come, amongst other things, with the growth of a substantial labouring population. The means of achieving this so far as the various functions of the State are concerned are indicated further on.

As land is the best and safest form of investment it ought to attract a large amount of capital for investment but it is the pitting of the intelligent and keen money lender against the needy but ignorant cultivator and there being no usury laws or any other check on money lenders, the rates charged are very high, some times ruinously extortionate.

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These difficulties have never been seriously grappled with by the State. The genius of the British people have been individualistic and their prosperity has depended largely on the policy of *laissez faire*. The Englishman thinks only when the actual difficulty has arisen. These let-alonist ideas have also dominated the acknowledged policy of the Government of India. No satisfactory reasons have so far been put forward to indicate why the State in India should not do something on the lines of what has been done in other similarly situated countries. To take a single appropriate example, the case of Hungary throws a good deal of useful light on some healthy forms of State assistance for the promotion of industry. The agricultural population of India is about 75 per cent. In Hungary in the year 1900 the agricultural population was 76·83 per cent. and the industrial only 5·26 per cent. Among the labouring classes, the percentage of agricultural labourers was 78·46. Of the imports 75 per cent. consisted of manufactured goods and of the exports 85 per cent. represented agrarian produce. Hungary had to compete with Austria, against which there was no protective tariff and she suffered from an absolute lack of skilled workmen. Legislation was first undertaken in 1881 for State aid and a fairly comprehensive law was enacted in 1890. In 9 years ending with December 1898, 1,609 new establishments were started with a total capital of 206,706,814 crowns. Apart from the laws giving

facilities to the growth of industries the direct encouragement given to new industries in the year 1899 was as follows :—

- 28,096 crowns for value of machinery.
- 43,600 crowns for education of apprentices in different trades.
- 10,600 crowns for purchase of raw material.
- 12,200 crowns for shoe makers, tailors, potters.
- 22,400 crowns for institutions for display of new tools and machines.
- 1,250,000 crowns for commercial schools.

What has been successfully achieved in Hungary may also be done in India and this brings us to the part the Government ought to take in the development of new industries in India, a subject dealt with by question no. 5.

The first requisite is information : when people desire to start a new industry they do not know where to go to for the necessary information. In my experience, the first promoters of a match factory in Calcutta brought out their machinery from England which proved valueless as match-making on a large scale had greatly decreased in England ; they had to indent fresh machinery from Sweden and that exhausted their capital and the enterprise came to an end. The first promoters of a hosiery factory in Calcutta imported their machinery from England ; the machinery is still lying useless : its manipulation was difficult and its produce unsuited to the Calcutta market. There must be a bureau of industrial information and industrial statistics under a Director of Commerce and Industry in each province ; bulletins must be published written by sound men who have studied their subjects in their actual application in other countries and these bulletins should be periodically and freely circulated through existing libraries, District Boards and Municipalities. The bulletins must be of practical value like the bulletins issued by the American Government. Consular reports of foreign industries submitted to Parliament should be published in India and freely distributed. There is a vast field in which the activities of the Department of Commerce and Industry can expand with advantage in the matter of making suitable information readily available. And from this point of view, it is necessary to let the people know about the services the departments like that of Agriculture and Commerce and Industry are willing and able to render.

While there is such a thing as protection for a special industry by direct subvention or indirect help, there are certain measures which tend to help all industries in common. Such is the one regarding information outlined above. Such is also the founding of industrial schools for an intermediate order of men—the overseers and departmental managers. Real technological institutes in this country do not exist and the present engineering colleges touch only a fringe of the large work which still remains to be done. The same may be said regarding commercial schools and colleges. That is one of the means of increasing men who understand in all its aspects the organisation of joint stock enterprise and who have got some knowledge regarding the relation of the industrialist to his banker, to the carrier, to the broker and all the other people engaged in occupation subsidiary to trade and industry. It may be argued that technical and commercial education are mere catchwords and that these schools will not produce either industrialists or businessmen. But we have the model of successful countries before us in this matter and it must be said that there will be no industries till greater effort and expenditure are directed to these ends. If we admit for the sake of argument the fear that the product of these institutions will run to waste for want of occupation, it is still not so bad as it looks, because after all there is considerable waste at the present moment in the youth of this country. How many thousands of our literary products are thrown into the waste paper basket of life because there is no need for them, and then emptied in tattered fragments into the highways of the world ? They are put away somewhere and of some, nothing more is heard, except at times of a suicide in some penal settlement or of madness in some distant jail. It could not be worse, it may be confidently expected that with larger activity of the State in technical and commercial education the result will certainly be better.

If industrial schools are started with a definite objective and fit in with industries in existence or industries which may with advantage be introduced and developed in the locality, they would serve a very useful purpose. These must be located in or near industrial centres and the teaching there should be of practical value by the right kind of men. A single teacher who has been acquainted with the various processes of industry after several years of practical work can do much more valuable work than any number of purely diplomaed people. The recruitment for these teachers should be from all countries possible where the industries in question are prospering. A more useful manner of imparting industrial training would be by free apprenticeship in model pioneer demonstration factories. There will be opportunity of understanding something of the commercial side of the enterprise. There will be opportunity here of turning out trained labour ; and lastly those who are about to venture on similar enterprises could, from the State factory run not on purely commercial lines, always receive useful suggestions and information. In addition to the industrial schools and to a certain extent supplementing their work we must have commercial schools also, not that commerce will make commercial men, just as law schools do not make lawyers, but a knowledge of the general principles of business enterprise, the methods of finance, the organisation of modern commercial and industrial concerns, all these which would be useful in later life could be taught there with

advantage. If the State will help industry, let them give us trained industrialists and young men with some knowledge of the principles of business.

Industrial research.

There is one further matter in which the State can and must assist and that is in the matter of higher industrial research. The results of industrial research are not available in a day and a good deal of outlay is necessary before results could have any practical value. No private agency working on commercial basis could be expected to do this work and the State must do it, in my opinion, in collaboration with the Universities. In the meanwhile, the State can provide consulting laboratories where industrialists can send over materials for analysis and general opinion.

Raising the work-
man's standard

With regard to labour I have noted some of the difficulties. The part the State can play in bringing into existence a really labouring population is to adopt means to raise the standard of life so that our workmen may appreciate the advantages of better living, of education, and better provision for their children. There should be free schools for workmen's children in industrial centres, and municipal authorities in whose jurisdiction industries are located should supply cheap and sanitary dwellings for the workmen; medical assistance should be available to them on terms within their incomes. Without education and a healthy life to be brought about by an all-round improvement in sanitary conditions, the efficiency of labour in this country could not be improved. I would also advocate special rates for the carriage of certificated workmen from their homes to the industrial localities and in order to avoid overcrowding in cities I should suggest special rates for working people on the local trains. If better homes were provided they would be induced to bring over their families with them in industrial centres and there will thus be a genuine factory population alert and efficient in their work.

State aid to indus-

I do not think direct State aid by way of subsidy would be desirable. The only case in which an exception may be made would be in the case of industries requiring large sums for experimentation. Even here so long as other forms of indirect assistance can suffice, this plan of subsidy should not be resorted to because it is likely to be demoralising both to those who are helped and to the officials concerned. Advances by the State are to be resorted to freely only in agriculture for improved methods or for introducing new crops, machinery and manures.

If two or three substantial zamindars or local magnates are prepared to stand guarantors, it is a question whether the State should not help in the way of capital by means of a loan for ten years. But the means of recovery and the unpleasantness attaching to it in case of unsuccessful ventures seems to militate against what appears a rather attractive suggestion at first sight.

Nor would I advocate guarantee of dividends for joint stock enterprise except in case of carrying companies as the Government have been doing in the past.

There are however indirect forms of assistance which I should like very much to press to the notice of the Commission. The foremost is the question of industrial banks. These may be started under the auspices of the State. Even here I should not suggest any direct use of Government money. The capital for these banks should be secured by sale of bonds interest on which should be guaranteed by the Government at 5 to 6 per cent. The Government may invest funds from the paper currency reserve and the gold-standard reserve in these bonds within certain limits. These industrial banks should be private corporations working in close touch with Departments of Industries. They should confine their work in a manageable area even if it exceeds the limits of a province. They should have full-time men with business experience as directors and technical men and chemists in their employ for information and advice. Such institutions, the details of which could be worked out by experts would be of very great value.

I would further suggest indirect help to industry in the following manner:—

- (1) *Facilities for insurance* :—British companies have been known to create difficulties: in the case of swadeshi steamer companies they have demanded higher rates for insurance of goods carried by them.
- (2) *Freight* :—Special rates should be given in the case of machinery for a new enterprise: this may be secured by subsidy to steamship companies.
Land carriages :—Special rates should be given for the transport of manufactured goods, raw materials, fuel and other necessities for factories.
- (3) Facilities as regards sites for factories, working men's houses, railway sidings may be granted.
- (4) *Re income-tax* :—Until joint stock enterprise begins to earn 4 per cent. it should be exempted from income tax, if it is a pioneer manufacturing enterprise.
- (5) Partial or total exemption from municipal taxation for locations in regard to new industries and working men's houses.
- (6) Supply of cheap power and establishment of Government power stations or taking over electric supply companies by the State.
- (7) Drawbacks on duties on machinery and raw materials in case of selected industries.
- (8) State demand for articles manufactured in India: these being given preference; in case of inferior quality, better methods may be suggested and insisted upon.

- (9) Monopolies for the manufacture of certain articles provincial or otherwise for limited periods.
- (10) Facilities for the purchase of machinery, through State agencies; at present accurate information is not available as to where the most suitable machinery may be imported from and parties are frequently imposed upon by middlemen.

In order that the benevolent intention of the State can be carried out, attention must be paid to the machinery through which this work would be done. And if the State will take greater interest than it has done in the past, the organisation of the Department of Commerce and Industry becomes a matter of great importance. The present practice of putting in a member of the Civil Service, who has had no previous training, experience or knowledge in any new post of sufficient importance and requiring special knowledge will not do. The Director of Industries must be a living force and not an atrophied and hidebound official. A practical businessman and one known for his interest in and sympathy with Indian industrial enterprise should be a Director. And whoever the Director may be, Indian opinion will regard his work with grave misgivings if he is not associated with a body largely composed of independent Indians—an Advisory Board before whom he should place all his work. The Agricultural Department suffers from the appointment of non-agriculturists and Civilian who are constantly transferred. We want practical men in the department willing to listen to suggestions of Indians of standing and experience through the Board. It is also desirable that there should be less red-tape and formalities in the work of the department. All suggestions for a better state of things would result in nothing in the absence of these precautions.

ORAL EVIDENCE, 4TH DECEMBER 1916.

President.—Q. Your note expresses your views with characteristic clearness, and consequently I have very few questions to ask you to supplement what you have already told us. There are one or two points that are left uncompleted, through oversight probably, one dealing with the functions of the State where you compare the population of India with the population of Hungary. You point out that the agricultural population of India is 75 per cent. and in Hungary in 1900 it was 76·83 per cent., the industrial population being only 5·26 per cent. Then you give an account of the sums of money laid out by the Hungarian Government for the purpose of developing industries and you proceed to say "What has been successfully achieved in Hungary may also be done in India." You do not, however, give any further reference to the ratio between the agricultural and industrial population. Do you remember what the figures were after this interval of twelve years?—*A.* It was a parliamentary report from which I got this. It was submitted to Parliament by the British Consul in Hungary. I have not unfortunately brought the actual reference with me. I can send it to the Commission.

Q. You have no idea as to what the result of the expenditure of the money was?—*A.* I am only speaking from memory. My impression is that the present agricultural population is about 22 to 23 per cent. in relation to industries.

Q. You mean it has dropped from 77 or 76 to 22 or 23?—*A.* Yes.

Q. And there has been a corresponding increase in the industrial population?—*A.* Yes. That is the case with Germany also. I have got this book, "Germany of to-day;" there it gives about the same figures in the chapter on Agricultural Germany and Industrial Germany. "The change is sufficiently striking. At the beginning of the 19th century over 80 per cent. of the population was agricultural. To-day less than 30 per cent. is so occupied. Even in 1895 the proportion was still 36 per cent. and 10 years earlier 42 per cent. and now less than 20 per cent. in Germany."

Q. In your note there is no reference to the source of those figures. I am only asking you to supplement it, with the exact reference and the exact results. There is no use in knowing only what has been spent unless you can show that it has been spent with definite results?—*A.* I say there "In 9 years ending with December 1898, 1,609 new establishments were started with a total capital of 206,706,814 crowns." Then I give the actual contribution by the State in a particular year. What I have ventured to indicate is that if we follow the same policy or a policy analogous to what they have followed in Austria and Germany—I was not able to get the exact figures of Germany at the time I was writing this note—I think we may follow it with success. I wrote this note rather hurriedly because I was limited to time as the note had to be sent within a particular date. If you will permit me I will supplement it in a supplementary note.

Witness subsequently sent the following supplementary note :—

In the written statement submitted by me to the Indian Industrial Commission during its sittings in Calcutta, I quoted certain figures in regard to the proportion of agricultural and industrial population in Hungary. My figures were for 1900, and in the course of my evidence Sir Thomas Holland enquired if I could furnish him with the corresponding figures of a more recent date. On enquiry I find that according to the census of 1910 Hungary had a total population of 20,886,487. Out of this agriculture and forestry maintained altogether 13,465,653 persons (earning 5,600,602, supported 7,865,051), while industry including mining and commerce maintained 4,298,101 persons. I have got these figures from a recent issue of

the Statesman's year-book (1915). Hazell's Annual for 1916 says that the larger half of the population in both Austria and Hungary is engaged in and dependent upon agriculture.

President.—*Q.* Hungary is a good illustration if one can follow it up, as they start with about the same percentage as in India; and we should like to know what the result has been in 12 years of the expenditure of Government money in order to aid the development of industries. I know Hungary very well and my impression is that it is still mainly agricultural, and I have never come across any other agricultural people so depressed or so miserable as the people of Hungary and especially of Transylvania where they are kept down by the Magyars?—*A.* Vienna struck me as a beautiful city.

Q. We have some figures showing the changes of population that have occurred in the districts around Calcutta since the census of 1901, these changes being largely the result of industrial development, and according to those figures there has been a great increase in the total number of people employed, especially in the mills; but most of these additional labourers in the mills are from outside Bengal, *i.e.*, from the United Provinces, Bihar, and recently there was a large influx from Madras?—*A.* That is so.

Q. Not only has the percentage of local residents gone down but the actual figures have decreased, that is to say, the actual number of Bengalis now employed in the jute mills is absolutely less than it was 14 years ago, while the percentage of change is still more striking. You have been able to survey problems of this kind from outside. We should like to know why the local population have not taken to the chances of labour while there has been an influx of population from outside provinces?—*A.* I have studied that question and I have given a brief summary in my note as to the reason why Bengal has not been drawn into the industrial life. The peasantry in the United Provinces and especially in Bihar where they depend upon two crops only is worse off than the peasantry in Bengal where with a good and well distributed rainfall and with fixity of tenures and fixity of rents they are much better off financially, and life in the mills is not attractive to the rural population of Bengal. I am connected with Bihar from which a large amount of labour is imported. There the conditions are these. The men are working here for a part of the year except when the paddy has got to be cut and they supplement their little resources by their earnings in the mills here and it was that what saved Bihar during the scarcity in Sir Edward Baker's time when he was administering Bengal. There was severe scarcity and severe drought, but there was nothing like famine because the labourers were working here and were able to send money to their families in Bihar. What I say is this, that unless we impart to the labourers a higher ideal, a higher standard of life, you will not get in Bengal—I am only speaking of Bengal which I know well—a sufficiently large labouring population. From East Bengal you cannot get any, because the rice in Barisal and the surrounding districts is such a plentiful crop and so well assured that people will not risk giving up their rice fields for labour in distant places like Calcutta, and jute has transformed the agricultural population of East Bengal into fairly well-to-do peasant proprietors, and therefore the only field of labour is West Bengal. And then unless the conditions are much better and unless you give them some education, and give them a wider outlook on life, a better ideal as to the standard of living, you cannot get labourers here. With the more or less loose lives that the cooly population have got to live, with practically no facilities for education, with a large number of men and women herded and living together, you cannot expect to draw into them the agricultural population of Bengal.

Q. Then your cure would be a more generous policy in the way of primary education?—*A.* Yes.

Q. In other words—we do not want to cast any reflection on the people outside Bengal—you practically come to the conclusion that life in jute mills is good enough for them but not good enough for the people of Bengal?—*A.* I do not wish to cast any reflection. There you have got the stimulus, the sting of poverty and destitution. Here you have not got it.

Q. We do not want to go into questions of educational ideals. You know it is beyond our province, but we cannot help looking at the question to a certain extent with a view to finding out whether want of primary education, or industrial education, or technical education is in any way a bar towards industrial development?—*A.* Yes.

Q. We should like your views on this point, and we will try to avoid going purely into questions relating to educational ideals. What we want to know is whether and what kind of education is really wanted?—*A.* What I say is this. Apart from the methods that I was just now referring to in connection with the difficulty of procuring labour from Bengal itself for Bengal industries, there is the big question of wages. The wages at present offered will not attract the prosperous agricultural population—the word “prosperous” is too much, I may say fairly well-to-do population, that is, the relatively prosperous agricultural population in Bengal. Secondly, as I have said, their outlook is very limited as regards their future, and thirdly I think whatever may have been the beneficent results of the education imparted it has been entirely one-sided. The education so far imparted has been practically literary education. I have had something personally to do with the starting of a few industries in my province. I do not say that I came off out of them well, and the difficulty is this that it is very hard to procure boys or young men who had been industrially trained, trained in the habits of discipline, obedience, working in regular hours and whose eyes and hands had been trained in particular directions. There are industrial classes amongst us, Bengalis, but they are more or less concerned, as I have stated in my note, with the industries belonging to their castes or

guilds. It is difficult to get them away from their respective professions. What I want is this. I see a great waste of human material that is going on under our present educational system and that waste may be easily saved for the benefit of the community if the lads of the population following agricultural and industrial pursuits were given some training which would render them useful as workers in any industrial concerns and which would make them valued for their skill and adaptability. I do not profess to say or believe that the schools can turn out finished articles, but they could train boys in habits and modes which will make them adaptable workmen when the work comes.

Q. In all forms of industries, as in all forms of business where competition is keen, there is no doubt that you will agree, probably above all things the value of discipline is very great?—A. Yes.

Q. I am speaking now with regard to the educational system at home as much as in this country. There has been a great slackening in the matter of educational discipline since the departure from the old times when our classical schools at home were almost essentially training boys in mental discipline, without regard to the actual value of the material imparted by way of education, and this discipline was carried out not only during class work but outside the schools by the boys themselves; and possibly in some cases it was overdone. You say we have transplanted into India a form of literary education which has found a congenial soil in the speculative genius of the people of this country. The higher castes among the people of this country have inherited literary and philosophical instincts of a kind that those of us in Europe cannot help admiring. Do you think it is fair to say on the whole that the speculative aspect of mentality is greater in India than it is among the peoples of Europe; are you more given to literary and philosophical work? Is that correct you think?—A. That is a very sweeping statement to make, but nevertheless we cannot overlook the fact that some of our castes and communities have had literary training from time immemorial, from a time much anterior to the period when Europe began to take to literary pursuits and naturally you cannot overlook the factors of heredity and environments, and consequently without any disparagement to our people or disparagement to the people of Europe I have found that we, the people of India, at least amongst the classes whose ancestors had been occupied with literary pursuits, are more apt than probably the peoples of Europe to take to philosophical pursuits, and I may say from my own experience both in Germany and in England, that curiously I found that the regions of speculation in philosophy, mathematics, and science into which the Germans had gone appealed to me more strongly than the universities in England did, for example, Oxford and Cambridge. The commercial universities stand apart. In the literary universities, somehow or other I found I was more in sympathy with the higher speculation of the German philosophers or mathematicians or scientists than with the work—I make very large exceptions—generally done in English universities.

Q. I should like your judgment on this proposition. It is another one in which my best friends do not agree with me entirely, so I want your independent judgment. For many years I have seen confirmation of the idea that education, if it is to be of real educational value, must be of the kind that forces into a student something that he does not like. There is no tonic which is not poison, but it is poison given in judiciously small doses. I give you this illustration, that I came across during my monsoon tour. There is a tree called the dhawa tree, which, in the old days, was used largely for tanning. That tree ordinarily does not give rise to fertile seed, but in the attempt to get enough tanning material from some of the plantations in Central India, by lopping off the shoots and leaves, some of these trees began to give a fruitful seed. It had its life threatened and at once turned to reproduce its species. It is dangerous to generalise from these natural laws as regards the problems of human nature. Do you think it is likely that the classical education which has been forced into the practical minded English boy has done him some good, and that, possibly, on the other hand, the literary and philosophical education which our Oxford educationalists have imparted to your people who are, as you say, endowed with speculative genius has resulted in their running into literary grooves in life?—A. On the first question my answer is in the affirmative, namely, that the study of classics has been of the greatest benefit to the English youth. If a man must live for something higher than what he is within himself, he must learn to have a nobler ideal of life, and for widening the natural horizon for a discipline of the mind, a study of the classics has been of inestimable benefit to the western youth. To us it has also done some good. I will not go into the very vexed question as to the relative merits of the classics in the east and in the west, as to the relative merits of the respective systems of philosophy. But we have come to realise that outside India is not all occupied by barbarians and we have come to realise that there is much to learn even in regions of speculative thought from outside, and that has done us a lot of good. It has taught us a true sense of proportion even in the atmosphere of mentality between the different races of the world and it has given us a glimpse of what a more robust life has been able to achieve in the domains of speculative thought.

Q. Coming down to the question of practical application to the training of boys, your people have inherited a beautiful philosophy and they have been taught to revere their philosophy and have got good reason to revere their literature. Do you think that we ought to have gone further and introduced them to something that was apparently not suited to their nature or outside their nature in order to give them a better balance?—A. I think that is right.

Q. You think that we ought to have introduced, for instance, instead of, or in addition to Chaucer and John Stuart Mill, the lathe and the forge?—A. Yes. We may have them supplemented by it. You know there are industrial classes in India by heredity and also commercial communities. These were a part of the social frame of the ancient Hindus, and they are even so at the present day. What you have done is this. You have conserved the priestly classes as pandits and you are slowly converting our industrial classes into pandits. What good is it to learn Anglo-Saxon grammatical forms out of Skeats? There I believe the mischief has been done—I do not say it was done intentionally—and we have got to reconsider and relay the lines to keep a good balance between intellectuality and industrialism. Our forefathers treated it in a different way. We have probably got to meet it under different conditions and on different lines now at the present moment.

Q. Your industrial population is on the whole comparatively among the low castes, and as the census reports show they are comparatively low in average education. You want the very best people in the country to take a share in industrial work. Don't you think that we could have managed to have imparted a better form of education suitable for the industrial development of the higher castes?—A. Yes.

Q. It is obviously these people you would really look to help their neighbours?—A. Men belonging to the higher castes have taken to the leather industry, to shoe making and other ordinary pursuits, and if a greater degree of attention was directed in that direction I am quite sure that our intellectual classes would feel that they are capable of taking a larger share in the industrial life of the country. At the present moment we labour under a sense of ignorance and diffidence because of our want of training, and it ought to be the object of the State in order to get, as you say, the best result, to educate those who are more intellectually advanced than the others in ways which at the present time are considered beneficial to human progress if not subservient to human happiness.

Q. Apart from the question of whether the higher castes should take to industrial occupations I gathered the impression during my monsoon tour that the artisan classes are unable to progress simply because they are deficient in the very elementary form of education, they could not for instance read a thermometer, or make a simple drawing?—A. You are quite right. That is the great difficulty which stands in our way in introducing better methods, either in agriculture or in the ordinary industries. That is the greatest difficulty with which we have been faced.

Q. Would you like to see manual training introduced in the primary schools, or would you like your primary schools to be confined purely to literary subjects and industrial schools provided as an additional training?—A. On this question I can only speak from my studies and not from my experience, because unfortunately in India we have got no industrial schools. From what I have been reading of Japan, Austria and Germany they have combined from the beginning in the elementary schools industrial and literary training in a small degree. I think both the mind and the faculty which is necessary for industrial enterprise should be developed *pari passu*.

Q. That opens up a very big practical difficulty. As you know at present, the schoolmasters in the primary schools are paid on a scale that makes it impossible for us to expect from them good teaching in the matter of literary subjects and knowledge of the methods of manual training?—A. Have you any idea as to what the gurus get?

Q. I have come across a school of 200 boys with a headmaster on Rs. 25, a second master on Rs. 15, another on Rs. 12 and another one on Rs. 10.—A. I was talking of the primary schools where you have got a class of teachers who are known as gurus. Up to the time of the administration of Sir Andrew Fraser in Bengal they were getting a pay of Rs. 3 a month which was supplemented by the boys, who were taught to take away from their homes some food or some articles even if their parents did not like. I was instrumental in getting their pay raised to Rs. 5. Not only here, but everywhere we are apt to depreciate the value of the teacher too much. I know the practical difficulty and it will exist for a long time in this country.

Q. Because of the financial difficulty?—A. Yes. But a beginning may be made and as your question suggests, probably for some time to come we shall have to provide in agricultural and industrial centres primary schools for the agricultural and industrial people for that kind of teaching, leaving generally the literary teaching to other elementary schools, and as our financial resources developed, and as we get more teachers who were the products themselves of these schools and of the continuation schools which ought to come into existence with them, the system might develop. In any scheme that the Commission may frame or we may suggest, you cannot expect to create a transformation with Alladin's lamp, and we must proceed by slow degrees. Unfortunately the slowness with which you have proceeded so far has been almost comparable to the slowness with which a policeman goes to the scene of riot. But I think that if we make a strong effort and we are satisfied with making a satisfactory beginning that ought to help us to get along.

Q. Don't you think you show a want of faith when you say that you cannot expect any improvement within a very short-time? My idea is that if we tackle this problem with real faith we may see results even in my lifetime?—A. You may see results in your lifetime and even within my lifetime. Without any question whatever, the Government or the people have not followed any definite policy in this matter. The result of a definite policy being followed, I am sure, will yield results within a measurable distance of time. Take, for instance, university

education. I am told, that when the first Hindu student in the Calcutta Medical College was induced to perform an operation upon a dead body guns were fired from the Fort William in recognition of the fact that a Hindu got over the prejudice of touching a dead body.

Q. What year was that?—A. It was somewhere between 1836 and 1837. After the Medical College was first established Madhu Sudan Gupta was the first man. In the course of 20 or 30 years we got a very fine class of Indian surgeons and physicians, and so I do not see why if we fire a gun when the first Brahmin begins to make a shoe now we should not get in thirty years quite as satisfactory results.

Mr. C. E. Low.—Q. You know that the percentage of persons who have received primary education is higher in Bengal than in any other province?—A. Yes. That is due to private enterprise.

Q. But as a result of that, people have not been drawn towards industries or agriculture? No, because that primary education has been literary education pure and simple.

Q. But there is a large industrial population in Bombay where presumably they have the same system of primary education?—A. But the conditions of life are different.

Q. The peasant cultivators of East Bengal, you say, are better off than these of North and West Bengal?—A. Yes, especially West Bengal.

Q. Do you know that out of the few Bengali factory hands a larger number of them come from Western Bengal than from the Eastern Bengal?—A. I have not had any personal experience of that matter myself, but I have found generally that it is difficult to get Bengali workmen except for very high wages, especially for skilled labour.

Q. Is it not the case that a far smaller proportion of *bhadralogs* in Bengal cultivate their land as compared with the educated classes in other provinces?—A. I am inclined to agree with you. It is so, that the *bhadralog* class in Bengal do not by themselves cultivate the land, whereas a Brahmin in the United Provinces or Oudh will cultivate land himself. There is a very big question involved in it—the system of land tenures prevailing in Bengal. The present state of things is this. I am a middle class Bengali, for instance, owning a small estate. I have got tenants settled on it from whom I receive rents. My dues to the State are fixed, and practically the dues that I get from my tenants are also fixed. This is the case in Bengal because the State is not the landlord, it has done this for the peasantry. It has stepped in between the landlord and the peasantry and has prevented the landlord from enhancing the rents except under very strict conditions which are more or less impracticable of being complied with. It is like the Land Act in Ireland introduced during Gladstone's administration in the eighties.

Hon'ble Sir R. N. Mookerjee.—Q. In theory?—A. No. I am a zamindar myself and I am saying so with experience.

To Mr. C. E. Low.—Q. It is very difficult to increase the rents and the lands are not with the middle class,—the *bhadralog* does not cultivate nor is he owning the land except as receiver of rents. He is nothing more. There are few people of the *bhadralog* class who are really in actual touch with the soil holding direct possession as cultivators or growers of any produce. In Bengal the middle class man keeps a few acres for growing his paddy, straw and things necessary for his household use which he cultivates, and the rest he lets out to the tenants.

Q. Does he not grow his paddy through the agency of tenants on half produce tenure?—A. Yes, on half produce, or he sometimes pays for the labour. There is a class of land in this country which belongs exclusively to the owner of the soil and to which a tenant cannot acquire a right of occupancy.

Q. Turning now to the cultivator, is it not the case that there is only a very small class of cultivators corresponding to the respectable agricultural classes—comparatively higher classes—in other parts of India, like Kumbis, Rajputs?—A. I do not know of other parts of India except Bihar and parts of the United Provinces. The cultivators there are a better class of men than in Bengal.

Q. You agree that the cultivator class in Eastern Bengal comes from the Namasudras and Muhammadans?—A. Yes, that is generally true.

Q. If one can go back a certain number of years, say fifty or sixty years, to a time when very few *bhadralogs* were engaged in Government service, they mostly lived on land?—A. Yes.

Q. At that time did they cultivate or simply live on rents?—A. They did not cultivate. They simply lived on rents or produce of hired labour.

Q. The results of the inquiry made by the Government some years ago show that practically no *bhadralogs* were engaged in jute mills?—A. I am just now running a hosiery factory and I do not know whether it will succeed or not. 75 per cent. of my workmen are Brahmins. Here is a sample which I have brought for your inspection. (Witness shows one banian.)

Q. Of course you cannot cover a large number of people because there are not many industries of that sort. But speaking of the few industries, the *bhadralog* class seem to engage more readily on manual labour in enterprises conducted by Indians. Do you consider that it is generally true?—A. In my small experience I have been able to get workmen from *bhadralog* class without much difficulty, from boys who are not earning a decent livelihood in other occupations.

Q. To what do you attribute that fact, as compared with the jute mills where you get no *bhadralog* working in manual labour?—A. In answer to your question I give you another

experience of mine. I am connected with a swadeshi hospital in connection with a swadeshi medical school. I am using the word "swadeshi" in no offensive sense. I find that poor people come to us in large numbers from long distances in preference to Government institutions managed by Europeans, which may be nearer because they feel that they would have more sympathetic treatment.

Hon'ble Pandit M. M. Malaviya.—Q. You have spoken of the results of State action taken in Hungary and Germany in converting a largely agricultural population into an increasingly industrial population. You are aware that that has been the case also in Japan? —A. Yes.

Q. And in the United States of America to a large extent?—A. I have not studied much the conditions of the United States, but Japan I have studied, because we thought we might adopt some of its methods, and Austria and Hungary we are bound to study because of the advance made by them.

Q. And you have noted in the case of all these—Hungary, Germany and Japan—that they have reduced their raw exports and increased their manufactured exports?—A. Yes, greatly. I have given the figures in the case of Hungary.

Q. Have you noted that in the case of Japan this was effected practically in the course of 20 years between 1890 and 1910?—A. In the course of thirty years.

Q. There was a good deal of discussion about the inherited tendencies of our people for philosophy and literary pursuits. Is it not a fact that until a few decades humanistic studies predominated in all the universities of the world?—A. Yes.

Q. Is not the systematic study of applied science a recent development?—A. Yes, except medicine.

Q. Even in the case of Oxford and Cambridge they have not yet got over that feeling, that humanistic studies should predominate in the universities?—A. Not quite.

Q. So far as these are concerned, as tastes and temperaments vary, don't you think that even when science has made the greatest progress, there will be some who will be drawn more to literary and philosophical pursuits than towards science?—A. Yes.

Q. You cannot expect that all or the majority of students in any country at any age will be drawn only towards applied science to the exclusion of literary and philosophical studies? —A. There is one thing which I wish to interpose here. I believe India is the only country where poverty was never considered a crime. Men were proud to be poor and therefore our ancestors oftentimes gave up the path which would lead to riches and chose the path which kept them in poverty, because they thought that that was more ennobling for the soul than the other. I do not think that it is a trait which you will find outside India, at least to the same extent. Even to-day thousands of young men of the *bhadralog* class voluntarily choose a life of poverty in taking up studies which they know will not bring them any benefit. That is a peculiar thing in our national life among the higher castes.

Q. And in support of what you say, you would probably refer to the study of mathematics by the pandits?—A. Mathematics, Vedanta philosophy and Nyaya philosophy.

Q. Is it not true that since the time that the present system was introduced by Government our education has been more dominated by literary and philosophical ideals than by the scientific ideal?—A. Certainly. Government, as you know, introduced scientific studies in the early seventies.

Q. It was only theoretical science?—A. Yes. In our days nearly all the experiments were performed in chalk on boards by a gentleman who was the first or second wrangler of his time.

Q. You have also spoken of the readiness with which the Brahmin and the Kayastha boys have taken to medical studies. That is also the case with engineering pursuits?—A. Yes. With scientific chemistry, applied physics and things of that kind.

Q. Is it not a fact that during the last fifteen or twenty years our students have taken quite as readily to scientific studies as they have taken to almost any other?—A. Yes. In fact they have taken to western methods, some of them with a vengeance.

Q. Can you tell us what is the number roughly the Association for the encouragement of the study of science abroad has sent out to America, Germany and England, say during the last six to ten years?—A. It is between 400 and 500 students.

Q. What is the name of the Association?—A. It is the Industrial and Scientific Association. The funds are very small.

Q. What is the amount of help that they give?—A. It is very little that they contribute. The boys have got to work as menials in America, some of them as shoeblacks, some of them as mechanics. They beg and borrow for their passage money from their friends and others who are willing to pay. They get Rs. 30 to 40 from this Association and the rest they procure by manual training or contribution from willing friends here. There are great difficulties.

Q. Among the students who applied for help, do you find a large number of Brahmin and Vaisya and Kayastha boys?—A. Mostly. Largely.

Q. Do they go abroad to obtain instruction in various applied sciences?—A. Science and industries.

Q. So that if you have provision for higher technical and technological instruction in this country there will be no lack of boys to avail themselves of it?—A. Because hunger is the great stimulus.

Q. You spoke of the difficulty about the salary of teachers in primary schools. You are in favour of compulsory free education?—A. Certainly.

Q. You spoke of the salaries of teachers of the primary schools having been somewhat raised? Was it recently?—A. In the last 10 years.

Q. Is it now Rs. 10 per mensem?—A. Rs. 8 to 10 in Bengal. I do not know about the United Provinces.

Q. Have you noted that in Japan the salary of teachers in primary schools is Rs. 12 a month?—A. I do not know.

Q. And 3·36 dollars in the United States, that is about Rs. 10·8?—A. I do not know. The teaching profession is very ill-paid everywhere.

Q. So that you will agree that the fact that we cannot afford to pay our primary school teachers as much as we should like to, should not stand in the way of spreading education among the people?—A. With the instructors we have got and the means we have at our disposal, we should spread education as broadly as possible. We should go to the extent of levying an educational cess if necessary.

Q. You have stated that in the general elementary education course you would introduce a little training in elementary science and manual work?—A. Yes.

Q. Is that the system in Japan?—A. Yes. In Germany also.

Q. You would introduce it either in the ordinary primary schools or in supplementary classes?—A. Yes.

Q. You also consider it necessary to impart commercial training so that our young men should become captains of business?—A. They might have some idea. Just as in the case of law if you give a lawyer a law degree he only reads the books and gets some ideas of the principles of law and finds it easy to get into the practice of law because of the knowledge of principles, the same knowledge of principles in commerce is necessary. By the way I may tell you this. There has been some criticism about the commercial schools in certain quarters, namely that mere scholastic education in commerce will be of no avail. I saw the Germans giving instruction to their boys, and they give commercial instruction to their boys who want to take to a commercial career. They have got a certain selected course which gives them a knowledge of the principles in which exchange of commodities takes place, some knowledge of commercial law, some knowledge of exchange and other things which are of very great assistance.

Q. You think that provision for giving technical education which will help students to produce manufactures is not more important than provision for commercial education which will enable our students to obtain supplies of materials and to market goods and to finance business?—A. Yes. Both are necessary.

Q. And towards that end you would strongly advocate the establishment of one college of commerce in every province?—A. Yes, and certainly commercial schools.

Q. You have spoken of industrial schools. You know in Japan they introduce commerce as a subject in the industrial schools. So, if you have not separate commercial schools would you make commerce a subject in the industrial schools?—A. In the secondary stage.

Q. You are strongly in favour of an industrial bank?—A. Yes.

Q. Do you think that it may be started under the auspices of the State?—A. Yes.

Q. This is one of the indirect forms of assistance which you advocate that the Government may render?—A. Yes.

Q. Do you think that if it is started under the auspices of the State the public will willingly subscribe the money that is necessary for it?—A. There will be no difficulty about money.

Q. You suggest that the Government should guarantee interest on the bonds which these banks may issue, say at 5 or 6 per cent.?—A. Yes.

Q. Do you think that if the Government guaranteed interest at even less than 5 or 6 per cent. the public would come forward to subscribe?—A. If the Government guaranteed even 4 per cent. the public would subscribe.

Q. You want the moral support of the Government much more than the financial support except in the way of this guarantee?—A. If the people feel that there is behind a concern the vigilance of the Government and its guarantee there will be no difficulty in getting money. You put money at 3 per cent. in your savings banks. What is the amount of the savings banks? It is some crores of rupees. The interest there is less than 3 per cent.

Q. You think that this bank should have men with business experience as directors and that it should have also technical experts in its employ for information and advice in regard to projects for which help may be sought?—A. I may illustrate my point. I start, for instance, a hosiery industry. I bring out machinery from England. I go to the ordinary bank. Assuming that I am a man of means, I say, here is my machinery which I have ordered, will you kindly lend me so much and I will furnish so much as margin. The ordinary bank manager has not

got the experience, he does not know whether the hosiery business is likely to succeed, he does not know whether I have ordered the machinery from the right class of people, whether the price I have paid is the proper price, whether I have got men who will be able to organise and start and carry on the industry, and he naturally refuses. If you had a banker with business experience, both commercial and industrial, whose duty will be to know these things, then I would get my advances much sooner, not only against my machinery but also against my produce and things of that kind, much sooner than I would get from an ordinary bank. As an ordinary banker I would refuse to lend money. If I was an industrial banker and if I were satisfied with the conditions that the industrial bank manager should wish to be enforced, I would readily give you money. In one case I would not have knowledge and in the other case I would have knowledge.

Q. Is it on the model of the industrial bank of Japan that you propose such a bank? —There is an industrial bank in Germany and in Japan working on similar lines with branches. Besides the bonds you have got enormous gold reserves.

Q. You suggest that a part of the gold reserves of the Government should be available to help a bank of that kind?—A. Yes. What is the use of these reserves being lent out in England on short credits at nominal rates of interest?

Q. Do you know what it at present amounts to?—A. No.

Q. You know that at present Government does help the Presidency Banks with the reserves?—A. I am aware of it.

Q. And you know the extent to which it does? The nominal amount is 70 lakhs for the Presidency Bank of Bengal, 50 lakhs for Bombay and 50 for Madras?—A. I think so.

Q. In practice it goes much above those figures?—A. That I do not know. I have referred to the Bank of Bengal for information but I have not got it.

Q. The Government reserves are of help to business men in England also in some form or another?—A. They are of very great help. You see the financial adviser to the Secretary of State is an Englishman of business connected with English commercial and industrial life. There are two financial advisers. I do not know the present gentleman. I think one is Sir Philip Schuster.

Q. The Secretary of State has got two financial advisers on his Council?—A. Yes. Both of them are English commercial men, and consequently without meaning to cast any reflection of undue treatment they would naturally be inclined to place greater reliance as regards safety of investments on English securities than on securities of which they have no knowledge. I have not got the figures just now, but up to last April the gold reserve in England was about 26½ millions of which 26 millions was invested in England.

Q. In British securities?—A. Short credits to bankers and things of that kind which ease the British money market or help it to a great extent.

Q. Without going into the exact figures, we can say that a portion of these reserves is available to British business men?—A. Yes.

Q. On very easy terms of interest?—A. Yes.

Q. And a handsome portion of the Government reserves is available to European merchants generally in this country through the Presidency Banks acting through exchange banks?—A. The Presidency Banks, I believe, hold the ordinary cash balances, not the gold reserve or the fiduciary reserve.

Q. A portion of the Government reserves is available to business men here through the Presidency Banks?—A. Yes.

Q. It is available, I have been told, to European businessmen, but not in a similar manner to Indian businessmen. Have you any information on this point?—A. I lay some emphasis on the expression that you have used "in a similar manner". I know that facilities are given to our people also, but I believe we, the people of India, have to satisfy more stringent conditions than the European in India has got to. I do not impute to the bank any question of partiality. It is probably because the European is a much better business man and the bank feels more security.

Q. I want to get at the fact of the matter?—A. It is a fact that facilities are greater.

Q. You say "Whoever the Director may be, Indian opinion will regard his work with grave misgivings if he is not associated with a body largely composed of independent Indians — an Advisory Board before whom he should place all his work." Would you make the Director bound to carry out the decisions and recommendations of this Advisory Board or would it be a purely advisory board?—A. That is a matter of detail which I have not thought out, and I do not wish to give an answer.

President.—Q. Most of the European firms are established houses of long duration? —A. The bank has not got the facilities for ascertaining the real credit of the Indian customers as much as of European customers. For instance, in the Presidency Bank I do not suppose there is any Indian director, nor has there been.

Q. Are there many Indian shareholders in the Presidency Bank?—A. Yes. I believe some of them hold large shares, but the number of shareholders is small.

Q. There has never been any Indian director on the Bank?—A. This Presidency Bank does not call general meetings. They elect their own members in a particular way, and not

through the shareholders in a meeting. I am a shareholder of the bank and I have never received notice of any meeting.

Hon'ble Sir Fazulbhoy Currimbhoy.—*Q.* Are these 400 or 500 boys who returned from Japan, employed in any concern?—*A.* I will tell you. I do not think these boys have received a thorough grounding in the subjects which they have taken up for learning. You see after you learn the theoretical part you have to be in a workshop for a certain time and you have to learn the process, first of all the manufacturing process. Secondly, as I have said in my note, there is a dearth of commercial men to put the products which these boys are able to bring forth into the market, and that I have seen in my own experience. The boys who came back after learning some pottery work, at first were unable to produce a quality which would be acceptable to the market. Then I know that the gentlemen who were interested in this work sent a man up at their own expense to finish his education as far as he could because from business men the trade secrets are very difficult to get at.

Q. Do these people who come out from the other countries after the little experience they get come to the top and start an industry and become the head?—*A.* You know we have not got the top or bottom.

Q. When you start new swadeshi concerns you bring out these men after education in foreign countries and do you put them at the head of a department?—*A.* Yes. He is the boss of the show. He is the manufacturer, the commercial agent, everything.

Q. You do not bring experts from outside?—*A.* No.

Q. And you do not let him commence from the beginning?—*A.* There are difficulties. Many of these concerns are under-capitalised. For the hosiery business, in which I was interested, we brought out a man from England on a salary of Rs. 350 to 450 a month and he knew only one department of the work and we ought to have two more men, but we have not the means to employ them and the whole thing came to grief.

Q. Are you connected in any way with the industries you mention here, at present, the Cotton Mills, and the Bengal National Bank?—*A.* At present I am not.

Q. Only with the hosiery?—*A.* Yes, except that I am a shareholder in those concerns.

Q. Do you think there are any prospects of this hosiery company competing with the goods of Japan which are being dumped into this country at lower prices?—*A.* I will tell you my own experience about hosiery. First of all, we produced articles which were not according to the requirements of the local market, they were either too expensive or too coarse. That spoilt our chances to start with. Then was the great competition against Japan, but now in Bengal there is a feeling against Japanese goods. When once you wear an undershirt made in Japan you can never wear it again. They have found that out. This is a sample of what we produce in our factory (Witness shows one banian). We are selling it at Rs. 7-4-0 a dozen. The hosiery factory came to grief and was wound up. Instead of selling the plant as scrap iron I thought I would make another attempt. I got a manager and he has been producing for the last two or three months, and I can produce three hundred dozens a day from my concern. We started not wholly with intelligence and knowledge and I am reduced to the least factor in the matter of production but I can produce 150 dozens a day. I am handicapped by the scarcity of yarn. German goods are not coming and the non-import of foreign goods, except from Japan, is in one sense an advantage. On the other hand the yarn which I was buying at nine annas a pound I am buying at Rs. 1-4-0 a pound and the price is going up every day. Even with this difficulty of price I find that during the last two or three months this produce has taken the market.

Q. Do you think that after the war you will be able to prosper?—*A.* I think I would, because my cost of production will go down, and I will be able to revise my prices and I shall be able to hold my own against the Japanese goods.

Q. With good results?—*A.* Yes.

Q. Can you tell us anything about this Bengal National Bank. Are they lending money to business, or are they simply doing shroff's business?—*A.* When I was connected with it it did use to lend money to industries.

Q. And made any loss?—*A.* The loss was owing to certain frauds.

Q. Do you think that if a commercial and technical college is established in Bengal, Bengal will take advantage of it?—*A.* Yes.

Q. Do you think that some of them will prefer it to literary education?—*A.* Yes. Because the market for literary education is over-stocked.

Q. You talk of an industrial bank. You have just said to the Hon'ble Pandit that if the Government guarantees four per cent. they will be able to raise money?—*A.* Yes.

Q. Can you tell us how this money should go to the industries? In what way?—*A.* I can tell you my idea. Supposing I am importing machinery worth, say, £10,000, I could secure myself, say, £4,000 pounds and I want the other £6,000. From an ordinary bank I cannot get it. When the machinery is landed at Calcutta I can get it from the industrial bank. The Bengal National Bank made some advance to a bucket industry which a man had started in Calcutta, the improved methods about which he went to England to learn, and when I was in the bank that industry was doing very well, but there was a difficulty of importing iron sheets and the bank helped the industry a great deal.

Q. If you are importing machinery the directors of the bank do not know what is the value of it or whether it is suitable machinery. If you have a Board of Industries in every presidency with a Director of Industries as the executive officer and if these people recommend that this machinery is suitable and that the Government experts advise it, don't you think that then only the bank should advance on these things? Don't you think it will be the safest way? In every presidency the local people know what industries will flourish in that province. Do you think that machinery will be all right?—A. I may only put my view because I have not seen the working of an industrial bank. Now if I go to Government for any advance, assuming that the Government is willing to advance, in the first place it is very difficult to approach Government for an ordinary man. There is too much of solemnity and form and dignity in approaching a Government official. I mean no disparagement to anybody. I go to the Minister of Commerce and Industry. He has no knowledge personally either of commerce or of industry. I am only assuming a hypothetical case, and I am not referring to any individuals.

Q. The Director of Industries is a business man?—A. He is, but he must have a guide. For instance, my friend on my right (referring to Sir D. J. Tata) is a great man in his own industry, but if I start a weaving concern or a hosiery concern he would not be able to advise the Government. You cannot have a Director of Industries who would be conversant with the various directions in which industries may be developed in an infant country like ours, infant in industrial growth. Whereas if you have got a bank where you have got only business men—I know the difficulties from the business point of view—with industrial experts to guide them, then the position is easier.

Q. You think there ought to be some machinery which will guide the Government bank to advance money?—A. Yes.

Q. About research work can you give us your ideas?—A. I am a grower of indigo and I have felt and I have suffered, I, along with other indigo growers, by reason of what I may say the culpable negligence of the State in regard to the indigo industry in the past, and if we had a research institute which could properly look after the interests of indigo growers things would have been very different from what they are during the last ten or fifteen years.

Sir D. J. Tata.—Q. You say "A very serious difficulty has been created by the fact that the existing system of education, while it has greatly liberalized and stimulated the mind of the country, is far removed from the actual facts of life which young men have to face when they are called upon to do practical work, and the result is generally disappointing." If practical education such as you suggest here were available would the people of Bengal take to it readily?—A. Yes.

Q. Does it necessarily mean that liberal education does not make a man fit for work in industries and commerce? Need the men actually be brought up in industries and commerce to be successful businessmen or industrial men?—A. No.

Q. Why do you want special industrial education?—A. I hope you have not had the same experience that I have had of spending four years of the best period of my life in getting up by heart passages from Shakespeare and Chaucer. Whatever may be the innate results of that process, the sum total of the net result is bound to be harmful in the sense that you are developing one side of the intellectuality of human assets and neglecting the other side. I am the last man to say that you should not have liberal education. I may tell you the experience of several of the Bengali middle class households. Every boy from the age of five is put upon a curriculum that he may, when he is a young man, be either a doctor, or a lawyer or an engineer. We have not got the capital. We have not got the place where we can teach them business. We have not got workshops or schools. Some of our boys are bright lads and the millstone does not grind them down. They go through the course all right. But the others are weak and they become wasted and you lose very valuable human assets. They run to the university. Probably the boy is not fitted for that education and he goes off the line and there you have got all the mischief from which we suffer at the present moment in Bengal.

Q. Is it not so much the fault of the recipient of the education as of the educational system? Why need the system be necessarily wrong? In England liberal education does not necessarily mean commercial or industrial education. Yet some of the most successful industrial and commercial men are men who have only received the ordinary liberal education in the universities. They are not specially trained. Why should not that happen in this country? Is it not owing to the peculiar character of the Indian student?—A. No. I will tell you. You will forgive me for giving my answer a personal tone. Suppose you had a grown up son who had come out as a graduate of an English university. After he had come out as a graduate you would take him with you in your business or with your influence you would put him in some other business house and he would have the benefit of having his liberal education supplemented by practical and commercial education. Where have I got your position, or patronage, or your friends? What is my son to do after having received liberal education? He must either go to law or medicine or engineering, or must go about committing dacoities to earn his livelihood.

Q. After receiving this education why should he not apprentice himself to some industry?—A. In the first place, we have not got the industries in Bengal, and in the second place you must not forget that by the time he gets out of the college he is about 24 or 25 and he is probably a married young man with probably a small family.

Q. The point I want to bring out is that the average Indian, perhaps more in Bengal than anywhere else, does not recognise the dignity of labour. He becomes a graduate as a means towards the end, that is he wants to be a graduate so as to earn a living. He will not work with his hands. If he is willing to work with his hands, I believe, in some industrial concerns in this country, there are many openings for our graduates. Do you think that the boys would be prepared to work with their own hands—I mean undergo manual labour?—*A.* Have you seen the conditions in which our students prosecute their studies? Ill-fed, with ill-ventilated rooms in their homes, with the same conditions in the college, ill-fed, underclothed, starving, physically oftentimes a wreck, with sight gone, with limbs weak, with a mind filled with high ideas, do you think he will take to manual work at that time of life, or would he be a good workman if he did take to it? Don't you think that there is something in the Indian system of caste where each craftsman is to begin his life early so that he may be a good workman, and is it not the same even under the modern conditions, if you want to take to manual work you must begin sufficiently early? Do you know of many cases in England where students having graduated from Oxford and Cambridge have taken to manual work as workmen?

President.—*Q.* That is often the case. I was myself an apprentice on a small salary and had to do manual work.—*A.* In the Engineering College at Sibpur they have to work underground as miners.

Hon'ble Pandit M. M. Malaviya.—*Q.* Are not some of our young men prepared to do that work? *A.* Yes. I will tell you my experience of our young men. I am referring to the organisation which probably many of you have heard of—the Congress organisation. In that organisation we have always to employ a large number of volunteers. They are young men of high families, mostly of the higher castes and generally of the highest families in wealth, rank, and social status and everything. They work as our menial servants, as sweepers, etc. One Brahmin in Lucknow acted as mehtar when I was there and they never complained because they felt that it was service that was needed of them. If it is needed and if the opportunities are open I do not think our young men will shirk. I have a much better opinion and a much more intimate opinion of our young men.

President.—*Q.* That is patriotism. One would like to know whether they would sit down and qualify themselves for actual business in the same way as a mining student in England has got to do?—*A.* I do not think you lack the material.

Hon'ble Pandit M. M. Malaviya.—*Q.* You do not think our young men will shirk or will fall back?—*A.* No. At present there is no opening.

WITNESS No. 103.

*Mr. S. H. Farrington.*MR. S. H. FARRINGTON, *Managing Director, North-West Soap Company, Limited, Calcutta.*

WRITTEN EVIDENCE.

The only thing that strikes me is that English and Continental firms can compete with Banking Facilities. us as they get cheaper money. When they borrow on good security they get money at 3½ or 4 per cent., but here, with the best security, the banks charge 1 per cent. above bank rate which is fixed by the Bank of Bengal, and mostly we have to pay 7 or 8 and now 9 per cent. for money. This has been a great drawback to us, the heavy interest on our industry, the profits of which are very small.

(Witness did not give oral evidence).

WITNESS No. 104.

*Mr. W. R. Cripe*MR. W. R. CRIPER, A.R.S.M., F.I.C., *Messrs. D. Waldie & Co., Chemical Manufacturers, Konnagar, Hooghly.*

WRITTEN EVIDENCE.

Q. 1.—I have not had much experience in raising outside capital for industrial enterprises. Capital.

Q. 2.—I have found that, if I took up the bulk of the share capital myself in any enterprise, others would come in. It is, in fact, a question of personal responsibility and confidence in starting new industries. I am not aware of any particular sources from which capital can be obtained, but the investing public, both Indian and European, will come in if they consider the enterprise is stable and of sufficient attraction. Small enterprises appear to be easily financed by Indian capitalists especially recently in Bengal since the Swadeshi movement gained strength.

Q. 4.—The financial aid which my firm has had from Government so far has been a Financial assistance. small sum to help in some research work at Cawnpore.

Q. 5.—As regards Government aid in general for new enterprises, I am not in favour of direct aid but of indirect assistance as specified in answer to *Q.* 56.

Pioneer factories.	Q. 7.—Pioneer factories would be very useful in certain industries of the smaller kind, but I have no experience in any in Bengal.
Financing agencies.	Q. 10.—I am of opinion that more facilities might be afforded by banks in connection with advances on mortgage to new industrial enterprises if the Government guaranteed the whole or part of the mortgage—the Government action to be guided by the advice of the Board of the Industrial Bureau. (See Q. 56.)
Technical aid.	Q. 15.—I have had no experience of technical or scientific aid provided by Government, and am not able to suggest under what special conditions the loan of Government experts should be made to private firms or companies. I would, however, suggest that the condition should be determined by the Directors of Industries in each special case.
Surveys for industrial purposes.	Q. 20.—As regards demonstration factories, my remarks under Q. 7 apply. Q. 25.—I am of opinion that further surveys should be made of the available resources of the country, especially in regard to mineral and forest products. The surveys could be organised in connection with the present Government staff of the Geological Survey and Forest Departments. The object should be the investigation of products of horticultural interest and further investigation of the mineralogical possibilities of the country.
Commercial museums and sales agencies.	Qs. 28 to 32.—As regards commercial museums and sales agencies, I am of opinion that larger industries should do their own advertising as they find necessary. As regards minor and unorganised cottage or village industries, I am of opinion that the style of emporium for the sale as well as display of the products should be carried out in a similar manner to the "Village Industries," Cawnpore, as instituted by the Director of Industries, United Provinces. For larger industries a directory or list, small and concise, of names of producers and the articles they produce would be advisable in English and two vernacular languages. One should be issued for each province, be easily available at a low cost, and be confined to actual producers in this country and not to retailers of imports.
Training of labour and supervision.	Qs. 44 and 45.—I am not acquainted with any arrangements to improve the efficiency of labourers, but in connection with the staff of industrial enterprises analysts play an important part. The Indian youth of good caste is adapted for routine analytical work, when available, and I would therefore suggest some intermediate laboratory training whereby a further year's practice in analysis might be obtained by students of the B. Sc. course. Special scholarships might be arranged in connection with this.
Official organization.	Qs. 56 to 66.—As regards the future development of industries in India, I suggest— (1) The appointment of a Director of Industries for each province. The Director should be a business man. (2) The formation of an Imperial Bureau of Industrial Research, with the necessary laboratories attached under the control of a Board. The Board should consist of not less than— Two business men preferably connected with manufacturing industries. One engineer. One chemist. One legal adviser. All the Directors of Industries <i>ex-officio</i> . The laboratories should be chemical, engineering and general-investigating,—each appropriately fitted, and under charge of qualified men. The laboratories should be in a moderate climate,—possibly Dehra Dun would be a suitable place. All applications for industrial help should be submitted to the Board through the Directors of Industries of the provinces. The Board would then decide whether the application was of sufficient importance to warrant investigation in the laboratories. The Board should also have power to grant the financial assistance necessary for the research, <i>i.e.</i> , any special plant or machinery, to carry out the original experiments on a laboratory scale. The pronouncement of the Board would have the effect of inspiring confidence in possible investors. A bulletin of the work of the research laboratories should be published. If considered advisable by the Board any particular research may be regarded as confidential if paid for by the individual requiring the research to be conducted. In case the suggested industrial proposition could not be dealt with in the laboratories it should be referred to a manufacturing or other concern capable of dealing with it which should be paid a fee for the investigation.
Prevention of adulteration.	Q. 91.—I am of opinion that a Food and Drugs Act is necessary in this country, especially at the chief ports and inland towns. Drugs of any quality can be imported and, if with the original labels on, are accepted as of standard quality in the bazars. As regards food, thousands of gallons of refined paraffin oil were formerly imported monthly, for mixing with ghee, edible oils, and castor oil.

ORAL EVIDENCE, 5TH DECEMBER 1916.

President.—*Q* I should like you to develop this idea of yours of having a Board of Industries. The idea as stated here is a little new to us. We have had certain other proposals put before us. You want to form an Imperial Bureau of Industrial Research with the necessary laboratories attached under the control of the Board. In that case you would have associated together, subjects that are different in character, such as chemistry, engineering, economic botany and entomology?—*A*. Yes.

Q. Another idea that has been put before us is slightly different. It has been suggested that we should have for these large subjects separate Imperial departments, each with a head, just as the Geological Survey is organised. The head of the department would be the chief adviser to the Government of India. He may or may not have direct control over all the officers of his department. He might be like the Inspector-General of Forests, purely advisory, responsible for the working plans and in general control of the policy, but not all the officers, who would be distributed for the benefit of the different Local Governments or for other departments. For instance it has been suggested in chemistry that we might have a Chief Chemist to the Government of India, and under him three Deputy Chemists one for organic chemistry, including vegetable dyes, alcohol, and so forth, and another Deputy Chemist would be responsible for mineral and metallurgical chemistry, while the third Deputy would be the Chief Agricultural Chemist to the Government of India, responsible for all the research work in agricultural chemistry. A similar arrangement might be made for botany and for zoology. With regard to the location of the chief offices and laboratories, there are certain vested interests that cannot easily be broken up or overlooked. The Chief scientific officers may not be in the same institution or in the same town, but it might be possible to get the heads of the departments into touch with one another by modification of the present Board of Scientific Advice. Would a scheme of that kind suit you just as well as having a Central Imperial Bureau of Research where you have botanists, engineers and chemists all associated with one another?—*A*. I suggested this simply with a view to do the things on a cheaper scale, as cheaply as possible.

Q. So that you have not thought of this other scheme? *A*. No.

Q. You think that your scheme would be relatively inexpensive?—*A*. Yes.

Q. The controlling board of honorary advisers would include two businessmen, one engineer, one chemist and one legal adviser?—*A*. Yes, if one man were placed at the head of a number of laboratories he could not have expert knowledge of all the departments. Therefore he must be assisted by advice.

Q. But possibly it might be practicable to have an advisory board assisting the head of each of these big scientific departments. For instance the Director of Geological Survey has nobody to interfere with him. It might be useful for him to be associated with a small board of honorary advisers who would give him some idea as to how the Geological Survey work can be best developed in the interests of the country. The same thing might apply to the botanical man, the zoological heads and the chief chemist. Do you think that would be feasible?—*A*. An Imperial Department would be much better. I was not regarding this as an Imperial Department but more as a sort of business proposition. I do not propose that this idea of an Imperial Department should interfere with any Government department. It would be quite a separate thing altogether.

Mr. C. E. Low.—*Q*. How often do you suppose this board would be likely to meet?—*A*. I thought they would meet quarterly or whenever a sufficiently important question were brought before them.

Q. Would it be possible for the directors to come from distances such as Madras and the Punjab?—*A*. One of the Directors of Industries said that they should meet together sometimes.

Q. Perhaps you refer to an annual meeting like that of the Co-operative Credit Registrars or the agricultural department. The Board of Agriculture meets once a year or once in two years to put their ideas together. They discuss their programme of work. That is the most important feature. Don't you think that it would be a tax on time?—*A*. That is so. Then the meetings might be held every six months or the papers might be sent to each member to vote on the proposals.

Sir D. J. Tata.—*Q*. In answer to question 25 you say that further surveys should be made of the available resources of the country. Some surveys are being made at present. How would you propose that their results should be made available? Are the surveys to be published in the Government gazettes? Is that the only way of disseminating information to the general public?—*A*. In this particular instance I was thinking only of special surveys.

Q. How would you make that available to the general public? By bulletins?—*A*. By bulletins or by records like those of the Geological Survey.

Q. Do you think people will make practical use of these things?—*A*. There is one case in point, which I may mention. And that is the examination of the reha soils. This has been undertaken by the Geological Department. That would be a thing for further examination.

Q. About the efficiency of labour, you say that Indian youths are used to make routine analytical work? Have you yourself employed them in any of your works?—*A*. We constantly

have one or more B. Sc.s. We have to pay Rs. 50 a month, and we have to educate them. Otherwise they plead poverty.

Q. Do you find their services useful?—A. Yes, after about twelve months.

Q. You have to develop them further?—A. That should be distinctly done if chemical industries are to go ahead. We must be able to have cheap analytical help.

Q. Do you find the B. Sc. or the I. Sc. or the man who has never been to any University better?—A. I cannot answer that question. I have not got any experience of the latter.

Q. When they come out of the colleges they have no practical training?—A. That is the thing. After training they get on well.

Hon'ble Sir R. N. Mookerjee.—Q. In paragraph 2 you say that you are opposed to any Government help financially?—A. I say direct help.

Q. Do you prefer that the bank should advance money and that Government should guarantee?—A. It seems to me a good idea that Government help for small industries should take the form of collateral securities with the banks.

Q. Would that not be more risky than if the Government simply guaranteed interest?—A. Yes. You cannot expect the Government to interfere directly. What I propose is that the bank should make the advances but the bank should be protected by the Government.

President.—Q. Instead of founding an industrial bank you apparently want to have the existing banks guaranteed to such an extent that they would safely indulge in advances made to industries which they cannot do at present?—A. I mean the advances made on mortgage of block to industries.

Q. You really are introducing the idea of an industrial bank, only partially, instead of starting with a new bank to promote industrial enterprises?—A. In my opinion the banking facilities in India are quite sufficient. If they are only protected they could help.

Q. I should like to know your views on a Food and Drugs Act. Before we can do anything in the way of legislation we must be sure that the necessity is real. In the matter of drugs for instance do you think that there is any serious abuse of the label at present?—A. It is all label business in the bazar. Anything can be imported and if it has the original label it is accepted as correct.

Q. And is that going on to any great extent?—A. I think so.

Q. To the extent that it affects the health and wealth of the people?—Q. It may do so, because they prefer to pay as little as possible for medicine. I was referring chiefly to foreign imported medicines. It does not refer to patent medicines.

Q. You think that the people who are the principal consumers are not able to distinguish or readily to obtain reliable opinions as to the quality of the food. Do you think they require protection?—A. I think so.

Sir D. J. Tata.—Q. I do not quite understand what you mean by the affixing of labels to bottles?—A. I simply mean that if any small manufacturer chooses to put an English label and send it out here that is taken as sufficient for the bazar and they believe that it must be absolutely genuine.

President.—Q. Would you like to make any supplementary statement?—A. I should like to mention one item in connection with the Forest Department. It would be a good idea if they would start the distillation of the wood industry in a place like the Sandarbans as a pioneer industry if private individuals are not likely to do it.

Q. Have you referred the matter to the Forest Department?—A. No.

Q. In a case of this kind where a department exists with an organisation to carry out suggestions of the kind it might be sufficient if you send the suggestion to the Department straight?—A. I will make that suggestion and see what happens.

Q. If it is not practicable for the Forest Department to help, it would be our business to advise Government to provide them with the kind of organisation necessary.

WITNESS No. 105.

Mr. W. T. Grice.

MR. W. T. GRICE, C.I.E., Messrs. Smith, Stanistreet & Co., Chemists, Calcutta.

WRITTEN EVIDENCE.

Government assistance.

Q. 5.—I think Government should do all in its power to assist new industries. Different industries must require assistance in varying forms, for example, where continual experimental work is necessary to work out what are practically secret processes, as in the chemical industry, firms would probably do sufficient experimental work at their own cost to ascertain the possibility of success. Any assistance then furnished by Government might be—

- (a) Grant of money to cover the erection and possible dismantling and subsequent re-erection of plant for working on commercial lines until the most suitable forms of plant have been discovered.

(b) The supply of plant on the hire purchase system.

(c) If the products manufactured were such as are required in any quantity by Government Departments a guaranteed purchase at a fair price of a portion or all the factory output for Government requirements for a sufficient period as might enable the industry to get in touch with the various markets.

Q. 17.—Where the industry is of importance to Government, expert assistance, if available, should be placed at the disposal of that industry. If the result is satisfactory the concern should be debited with the cost of his services. Technical aid.

Q. 18.—If the Government paid expert were assisting a private business I should allow no publicity. Government could arrange to have first call upon the finished output if they required it, otherwise the private business would cease to be private, and competitors in business would be made wise on the particular subject without the worry of experiment, or the waste of time or money beside which foreign firms would largely benefit. I understand in this connection that the "Indian Trade Journal," before the war, had as large a circulation in foreign countries as in India or in England. Where the industry was of the nature of a cottage industry or where a large number of persons would be interested all possible publicity should be given.

Q. 25.—Agricultural, forest and mineral surveys should be further extended, and Surveys for industries should be run in connection with a Department of Industry. Requirements in raw material for any industry should be tabulated by the department so that the survey could open up its enquiries on specific lines, the results to be communicated to the industry interested either direct or through the Secretary of the Chambers of Commerce or Trades Associations. My firm has repeatedly been asked to obtain small quantities (1 or 2 tons) of forest produce for experimental work, and have known that a regular demand would follow if the experiment proved successful. This applies to medicinal requirements for leaves, roots and oil-yielding seeds growing in Indian forests. The officers of the Forest Department will usually give us all the information they have regarding these, but will not undertake collection for us, nor, as a rule, can they recommend a reliable collector. In short they do not want to be bothered with small items, naturally. We have no staff to send to collect, and it would not pay to send a trained man to collect small quantities (1 or 20 tons) of such forest produce possibly to the Himalayas or to Southern India, who might be required at many different points simultaneously hundreds of miles apart. Thus possible sources of profit to the Forest Department are left untapped. It should be possible for the Forest Department to carry out the survey of medicinal plants growing in their forest, and to arrange for collection when required. They are familiar with local labour and conditions, time of collection, etc., and could do this with very small expenditure or trouble. When such a survey was completed the available information would enable the department to state with some precision what quantity was available, nearest port of shipment, and approximate cost of collection in each district.

Q. 34.—Trade representatives should be appointed in Great Britain, the Colonies and Trade representative foreign countries, furthermore our Consuls in foreign countries should act like the Consuls of other countries, *viz.*, America, Japan and pre-war Germans, who called upon industrial concerns, made a list of their requirements, which were sent to their respective countries, and resulted in many letters from the manufacturers in these countries and subsequent business relations. This matter requires placing upon a systematic basis.

Q. 37.—Government Departments should publish lists of their requirements, and have an Government easily accessible exhibit. Practically every firm on the India Office list has an agent in each of the three large cities of India. Local storekeepers would get exactly the same terms for requirements purchased through these agents, would get their goods quicker, and could explain their special requirements more easily. Stocks would be kept by local agents, and the whole Government purchasing put upon a business basis. Storekeepers, in my opinion, should be business trained men, and not army officers, medical men, or civilians.

Q. 40.—Raw material, such as forest produce, should be strictly controlled. I have on several occasions arranged for the whole output from certain districts to be sold to me, but only limited quantities have reached me consequent upon speculation and bribery which has undoubtedly affected collection. Leakage has been known to occur though practically impossible to trace.

Q. 44.—Skilled labour in my business is very essential. I have, with the exception of the analysts, had to train my own labour. We take apprentices in all departments, but find that school trained men are not sufficiently practical to be of use without much supplementary training.

Qs. 89, 91 and 93.—There should be a Food and Drugs Act, and all misdescription of goods and adulteration could be dealt with under this Act. Certificates of quality, etc.

Q. 97.—Rail freight, to my knowledge, is at present interfering with several industries, which otherwise might be worked at a profit. Government could possibly arrange subsidised rates to deal with these industries.

Shipping companies also do not assist small local industries.

My firm is interested in the manufacture of thymol in India from Indian raw material. We are shipping this to England to compete with the preparation made in England from Spanish raw material.

In October last we shipped at 185 shillings per ton of 50 cubic feet. This rate we did not consider unreasonable under present conditions as it represented 1·531 annas per pound.

In November we applied to two shipping firms for freight for another consignment of the same article when we were quoted respectively 3 per cent. and 4 per cent. *ad valorem*, the enhanced rate being charged because it was valuable cargo. This works out at 9·72 and 12·96 annas per lb. respectively, while parcels post will deliver at the door at 3·27 annas per lb. Incidentally I might mention that we receive from England, practically by every liner, cargo equally valuable, *e.g.*, quinine, etc., on which we pay exactly the same freight as other drugs, so that the "valuable cargo" reason is purely a local idea, as no special care is taken of such shipments over other cargo. Thus the new industry would be penalized unnecessarily to the extent of over 1 shilling per lb.

ORAL EVIDENCE, 5TH DECEMBER 1916.

President.—Q. Do you wish your evidence to be recorded as confidential?—A. I wish several of my remarks to be regarded as confidential.

Hon'ble Sir F. H. Stewart.—Q. With reference to the difficulties of freight do you think that they affect you seriously?—A. Absolutely.

Q. You cannot owing to these compete with the preparations made in England?—A. It is penalising us to such an extent that makes trading from here almost impossible.

Q. How is this thymol packed?—A. It is packed in tin-lined cases with wood an inch thick.

Q. You know that the rates of freight on everything have gone up very greatly?—A. Almost everything we get out and many of the heavy chemicals are very high priced. They come out at measurement rates. The shipping companies do not take any special care. I therefore think that we should be charged in the ordinary way.

Q. The steamer people do not take particular care?—A. I do not think so. We pack the cargo securely.

Q. Do they stow it near the engines?—A. They are not asked to. Thymol should be stowed away from the engines as it is very volatile.

Q. If you do not mind I should like to have a note showing how these rates are interfering with the industry that you are working up?—A. I will see you on the subject.

President.—Q. You complain about the Forest Department not being able to supply you with quantities of raw material when you wished to develop medicinal plants. When you made a request of that kind did you assure them that you are a purchaser on a large scale or did you merely send for samples?—A. We have written to the forest officer of the Division and said that we wanted to get a certain quantity whatever it may be. We have asked frequently not, in Bengal particularly, but also in the higher ranges. We have asked them to recommend a respectable man to collect because it is naturally impossible for us to send a man, say, to Kashmir to collect 10 tons of any special root. The invariable reply has been that they could not assist in that way at all. My idea is that if the Forest Department was properly organised the Department could with very little expenditure of time and trouble collect the details that would be available to any industry. I am speaking of my own industry particularly. The forest officer knows how a plant is distributed in the district.

Q. Have you made many requests and have they been all unsuccessful?—A. I have made many requests and practically in every case we have been unsuccessful.

Q. Have you communicated with the Provincial Conservator of Forests or have you applied to the Forest Economist?—A. To the Conservator direct in some instances and to the provincial men whatever their rank may be in the different districts. For instance if I know that a certain root is available in a certain district I have asked the man in charge of the district to help me. They have always been most courteous and helpful in locating the spot as far as the book work is concerned.

Q. Have you never applied to the Forest Economist?—A. I cannot say I have. The difficulty is to find out the correct channel of communication sometimes.

Q. One has to remember that so far very little has been done in the way of developing drugs from the forest raw material, partly because you people have been making it so easy by getting the things from home. This is a recent development?—A. We have been trying for the last five or ten years to do as much as we can in the way of developing forest produce.

Q. You say that Government Departments should publish lists of their requirements and have an easily accessible exhibit?—A. Practically every firm on the India Office list has an agent in each of the three large cities of India. Local store keepers would get exactly the same terms for requirements purchased through these agents, would get their goods quicker and could explain their special requirements more easily. Stocks would be kept by local agents and the whole Government purchasing put upon a business basis.

Q. I suppose that you recognise that there is risk of abuse when junior officers have permission to purchase their own stores. Each officer has to purchase a large variety of stores, in fact a larger variety than he could be expected to have intimate knowledge of. Do you not think it would be better if we had in India a sort of stores purchasing department

similar to that at the India Office so that when the requests come in from the Local Governments or local officers these could all be amalgamated and the Central Purchasing Department will then be in a position to obtain contract rates and even to issue forward contracts. They would also have a staff to check the quality of the purchases. Do you think a system of that kind would be better than leaving the local officers to make their own purchases?—A. The point I want to make is that if you had a business man running it, the possibility of juniors having commissions and things of that kind would be considerably minimised. In many cases the purchasing power now is left by the Bara Sahib in the hands of his junior. That is why I have said that the store keepers should be practical business men. I have known many instances and could give them if necessary. If a head of a department were buying the requirements for that department regularly he would know enough about it and the firm which has got a reputation and the future business to look to, would not kill the goose that laid the egg.

Q. There is another difficulty : an isolated officer does not want to take the responsibility of purchasing certain things that he has no personal knowledge of. Still another difficulty is the frequent changes that occur in officers. You get a man who has a special liking for one kind of thing and another man comes in who wants a totally different thing?—A. That is quite so.

Q. Do you think then that a Central Purchasing Department would be useful?—A. I think it would be useful.

Mr. C. E. Low.—Q. You speak of the difficulty in getting the Forest Department to contract and the inability to make reasonable terms with the contractor. It has been suggested that the Forest Department should have a commercial side which would have two men for the larger provinces and one for the smaller provinces. He would have some knowledge of forest work and also have some commercial training. Do you think that would assist?—A. I think it would very considerably.

Q. Do you think that the establishment of such a commercial branch would be a benefit to industries in India and also indirectly serve the interest of Government?—A. Undoubtedly. I have had several instances brought to me. I had sent to me by Mr. Pearson a couple of gallons of oil from oil yielding seeds for soap making. I was then director of a soap company. The oil was suitable. I asked for particulars how it could be handled on a large scale. I was ready to place an order for large quantity. I was informed that there was only a limited quantity available and after that I could not get any other particulars about it. That is a case in question. The Forest Department could have made much money practically speaking.

Q. With reference to your Indian employés in what capacity have you tried them?—A. I have tried them in every capacity. I have got analysts in my laboratory from the University and I have got the indigenous compounder class from the Campbell Medical school. I have got all grades of men.

Q. What sort of work can you get out of the University men?—A. They are very slow. They require training. They come with theoretical knowledge and we teach them to apply it.

Q. How long does it take to get the men up to the proper standard?—A. In twelve months' time they begin to be useful.

Q. Do they stay with you?—A. We have had men for a considerable number of years.

Q. What sort of pay do they get?—A. They get Rs. 100 a month. Some are getting Rs. 150, 175 and so on.

Q. What kind of work do you put them on?—A. General analytical work. I have got two European analysts. The Indian employés work under them.

Q. In answer to question 111, you say that you have some confidential information about certain new industries for India?—A. One of the things I have in mind is starch. I wanted to start a starch factory myself because there was such a great demand for it in the jute mills and in the cotton mills. But I was not able to get the money that was wanted for the purpose. Then of course the war intervened and I have not interested myself very much since. That seems to be an industry that may be pioneered by Government because the material has hitherto come from Germany. We can as well do it here and it is practicable.

Q. You also think that there is no private individual who will take it up?—A. If some one had had the money at his disposal possibly it would have come into being some three or four years ago. My own figures point out that it is quite practicable to do it.

Q. Do you know what they have done at Pusa?—A. No. I read the publications of the Geological Survey.

Q. You mean the trade journals?—A. I heard that the trade journals are turned to very good account in Germany and on the Continent and that they had a larger circulation in Germany and on the Continent than in India and England.

Witness here gave confidential evidence.

President.—Q. Do you get the Geological Survey publications? Are you a permanent subscriber?—A. Yes. I think the other journals want systematising in the same way.

Q. Do you undertake analysis for various people?—A. Yes.

Q. Do you think it would be fair or practicable to communicate your results to Government confidentially?—A. It would be for the other party to say. I am exactly in the position of lawyer and a client and a doctor and his patient.

Q. There is an enormous number of valuable data that are buried at present?—A. I think that without mentioning particulars of any kind the information could be given to Government without any breach of etiquette.

Sir D. J. Tata.—Q. With reference to your remarks about the B. Sc.s, do you mean to say that they have no originality and that they do only the routine work?—A. I do not say that. The men come to me with a certain amount of book learning and they want to have some practical training.

Q. Do you think they come there only for the purpose of earning their livelihood, without any idea of improving themselves with a view to do original work?—A. I am afraid that is so.

Q. You find that they simply carry out the routine work without attempting to invent processes? Is that the feeling of the average student?—A. They want their practical side developed. They can learn anything.

President.—Q. Can you tell us whether the manufacture of starch or caffeine was suggested by any of the Indian students? Have they ever suggested to you any such new development?—A. No.

Hon'ble Pandit M. M. Malaviya.—Q. Have you heard of Dr. Harischandra of the Berlin University at Dehra Dun who has manufactured farina?—A. No. But I know that several people have made it.

Hon'ble Sir F. H. Stewart.—Q. In answer to question 25 you refer to speculation in minor forest produce. Where are these?—A. They are in the district where the produce is collected.

Q. Are you not sufficiently far advanced and strong enough to collect your own requirements?—A. The point is it is so very difficult, because you have only a small quantity of produce from one particular district. It means a very big area.

Q. The Forest Department should be so developed on the commercial side that they would give information and execute orders?—A. They would also see that the forests were not robbed as they are at present. I had the collecting rights and I got only two-thirds of the yield. The rest was taken away by people who were on the spot and could bribe the forest officials.

Q. With regard to question 97, could you mention any particular industries which are hampered by railway freight?—A. I might mention citric acid. When it went up to 5 shillings a pound I conceived the idea of making it from limes. But when it came to practical politics I found that freight would cost 15 as compared with the Italian price of 5, I mean other things being equal. It struck me that possibly if I had approached Government and said that this industry needed underwriting something might have been done.

Q. Cannot you start the business where the limes are?—A. It is too complicated to manufacture there. One might make the preliminary tests there.

Q. What is the respective lead between the Italian and the Indian factory?—A. The factory and the garden in Italy are close to one another. I mean granting that the fruits give the same yield I am penalised by distance.

Mr. C. E. Low.—Q. You are aware that the Agricultural Departments are tackling this question with a view to find out more suitable areas for fruit-growing and to concentrate the growing in order to make arrangements for marketing and so on more easy? Have you put yourself in communication with them?—A. If I had been really going into the question I should have done so. I had not much time to think of the subject. I put the point as it came readily to my mind.

President.—Q. Do you think that a Food and Drugs Act is necessary?—A. I think there is very great need for it.

Q. Do you mean to say that the honest firm is handicapped?—A. Yes; I have seen an order sent home for sweet spirits of nitre, the order stating that the spirit strength should not exceed 23 underproof. If sweet nitre were made with underproof spirit it could not contain the percentage of ethyl nitrite it should contain. Consequently the Doctor who prescribes it loses his reputation, the patient his cure and Government loses about Re. 1 per lb. on the duty as the correct strength should be 58 overproof at the present time, any bottle which has a European or American label is taken to contain what the label says it has and this is frequently false.

Q. Where do these things come from?—A. From Germany, England and America and they are made in this country. I have seen them made locally. If there were a Food and Drugs Act they could be penalised. I have known three cases that went to the Police. In one case the man was fined Rs. 100.

Q. That did not hurt him much?—A. He got it out of the first batch of stuff that he sold. This is one of the great needs of the province from a health point of view and I would like to draw the attention of the Commission to the urgency of this necessity.

WITNESS No. 106.

MR. A. F. C. FORBES, *Messrs. A. Forbes & Co., General Merchants & Agents, Calcutta.*

WRITTEN EVIDENCE.

Generally speaking, I do not favour the principle of Government assistance as it calls into being enterprises of unsound foundation. Any of the existing banks in India will start financing a new concern which is really sound and has some capital of its own to commence with. Only where the aid of a bank, for reasons other than unfavourable to the new venture, be unobtainable would I suggest Government help in the shape of loans with interest. A concern which cannot pay a moderate rate of interest for accommodation is better advised not to start at all.

I consider commercial museums most valuable, and not less so exhibitions which should be popular in character having besides as object the bringing together of buyers and sellers.

I think that lists of articles used by Government departments should be regularly published in the commercial museums and the articles be exhibited if at all possible.

I consider registration of partnerships very necessary, declaring, apart from the name or names of partners, their nationality. It should be made impossible for minors to figure as partners.

ORAL EVIDENCE, 5th DECEMBER 1916.

President.—Q. You sent in a short note to us and have told us that you think the commercial museum would be valuable for exhibiting the articles that Government departments are now using. Do you think it would meet your case if once a year the Government issued a report giving a list of the articles purchased in the past year, together with—as far as possible—the prices paid?—A. I think it would.

Q. You recognise that it is very difficult to exhibit these articles in commercial museums, as there would be changes made so frequently that it would necessitate heavy expense?—A. It would.

Q. What difficulties have you found with regard to the want of regulation as to registration of partnerships?—A. I have never personally found any difficulties, only that it did not exist especially in former times. When I first came out here the practice obtained that in dealing with native firms, sometimes, if you wanted to go for the man he said, "I am not the responsible partner." This is what my remarks refer to. If that still obtains to-day I cannot say. That goes back very far.

Mr. C. B. Low.—Q. Do you remember some two or three years ago Government actually prepared a list of stores they obtained on indent from England, but very little use was made of it. It took a very long time to compile, it came out very late, and by the time it was out, the prices were entirely out of date?—A. I remember that.

Q. It was a very bulky document, gave a great deal of labour in compiling, and I think it would have been very difficult to get it out any quicker unless you had a special organisation for that purpose. Do you think it would be worth such special organisation?—A. I really don't think it would have any true practical value unless such prices were kept up by a body of merchants and constantly renewed, so that when a man asks "I want the price of a given article" to be able to put my finger on a given firm who would give me the very latest quotation. That would mean enormous organisation. The value is lost, because the true value of a price or quotation is immediate knowledge after it has been established in the market.

Q. Do you think it would be possible to do anything in a selective way, with the help of a committee of business men?—A. In that respect the nearest thing I know of, and really useful, is the Chamber of Commerce Price Current. Anything like that is of real use.

Q. Are you interested in the hide business here?—A. Yes.

Q. Before the war the path of those hides was mostly in the direction of Hamburg and Bremen?—A. Yes, Germany and Austria. The two ports you mention were the ports of distribution.

Q. Both you and the German users were very largely under the control of the Hamburg and Bremen ring?—A. I don't think it was a ring so much as that these Hamburg and Bremen merchants practically held the monopoly. They were very large dealers and bought hides and sold them to tanning industries.

Q. I now understand that it is your desire that other British firms in Calcutta should substitute for that previous German connection either British connection or local manufacture?—A. The idea is that that business is to be kept in British hands as far as possible.

Q. From a purely business point of view, which is the most promising business, to get the hides bought and dealt with in England, or made into the finished article in India?—A. I would say both. Let India take first whatever she wants. Support that as much as possible, and let the surplus go out of the country.

Q. Which do you think is the most promising, speaking from the purely commercial point of view?—A. I would say, of course, commercially, if you only think of the merchants, they would say, "I would sooner have the export trade supported and fostered." The merchant does not think of the other people.

Q. That is because he has always been in the export trade, but some tanners are also considering the question of local tanning?—A. The local tanners naturally would not come to us for hides; they would do the buying themselves in our local markets.

Q. But you yourselves are thinking of local manufacture?—A. I am not interested in any local manufacture, neither prospective nor actual. I did not know that idea had started.

Q. Are you in a position to say with any confidence whether it is a feasible proposition, a local tannery on a large scale?—A. I think so if the men who undertake it are really practical men. Since I have been in India—I speak of Calcutta chiefly—there have been two or three attempts which have failed because they never had practical men to do the work, and you were generally in the hands of men who either took to drink or who did not know their work well enough, and so the thing failed.

Q. Do you think there would be the capital forthcoming for a scheme of that sort?—A. Yes, I should say so.

Q. Do you agree with this presentment of the reasons why hides went to Germany before the war. It has been put to us that the British firms—the tanning firms—concentrated themselves more and more on heavy hides and certain high classes of tanning work; the trade in these lighter hides, because it was neglected by England, began going to Germany in large quantities. There was an understanding between the dealers in Hamburg and Bremen that they would oust any German tanner who bought otherwise than through them, and would refuse to deal with any Calcutta exporter who sold in any wise but through them?—A. Yes, that state of affairs existed. The Hamburg and Bremen importers stated that they were so overrun with offers and new marks from several firms with German interests. Of course the hide export business had increased considerably. Then these men said, "if you will only work through us and chiefly support us who are the distributors, we will not push any new marks, but will push the old marks."

Q. Is there any truth in the story that a firm here was boycotted by the Hamburg-Bremen people or by Calcutta exporters?—A. By the Hamburg and Bremen people. As far as I know, because at that period I myself was not a shipper in kips. I dropped out of it because the competition got so horrid.

Q. What did you deal in—arsenicated or dry-salted?—A. Now both. In those days my chief business was in buffalo hides and goatskins to America.

Q. Do you deal in Agras or Daccas?—A. Both.

Hon'ble Sir F. H. Stewart.—Q. Is not expert knowledge in the purchase of hides very important, and is it not very difficult to find experts?—A. Yes.

Q. Is there any chance of these experts being forthcoming from England?—A. I should say so. But for the hide business, apart from mere expertness to judge hides, you have to gain your knowledge locally.

Q. For whatever reason, 80 per cent. to 90 per cent. of export hide buyers have been either Germans or German Jews?—A. When I first came out to this country the whole business was in the hands of Germans or German Jews. Those were the only people who would handle them. The average Englishman would not. I remember how it shocked me when I heard about hides. I did not fancy it at all and thought it very *infra dig*, but as you have got to do your work in the firm by whom you are engaged, I afterwards had to take that up as part of my work, not only the technical work but the bazar work.

Q. You got all your training out here, both technical and otherwise?—A. Yes.

Q. Does the class of man exist at home to-day who can come out as an expert?—A. He would have to learn local ways of buying, because hides here are bought all round. The men, up-country, bring them down, and bring everything, good, bad or indifferent in one bundle. Then you as an expert—you have got your assorters for it—sub-divide that bundle into certain selections. You know from your prices which you get in Europe or America what these individual selections are worth. You make your calculation and then you say, "I give you for this all round so much." You either get the bundle or you don't.

Mr. C. E. Low.—Q. Selections vary in different firms?—A. Yes, but not very much. It is not very much larger than in the jute trade.

Hon'ble Sir F. H. Stewart.—Q. Purchases are made in the open market, not by a system of contract or guarantee?—A. You buy all round in the open market.

Q. How long would it take for a man to pick up the necessary local knowledge?—A. Very quick. Say you engage at home a young tanner, or someone who had been in one of the big brokering firms at home, he would very soon find his way.

Q. If he came out and put his back into it, he would know his way round in a year?—A. Yes.

Dr. E. Hopkinson.—Q. There are other markets in hides besides Germany and the United Kingdom?—A. America is one, Italy, Spain, Scandinavia. The largest consumers of our hides were always Germany and Austria; next came Italy, next Spain and Scandinavia. England

always took something, but England dropped back after the Franco-German War. Before that time England used to supply the Continent with leather. After the Franco-German War, German competition combined with the Madras tanneries, drove our British tanners more or less out of the trade. Kips formerly were tanned only by Yorkshire and Lancashire tanners.

Q. Are you attempting to develop business in all these countries, or especially in the United Kingdom?—A. In all. I am trying to take up my old connection with England also.

Q. Because other countries have failed?—A. Yes, with other countries the kip's trade is quite an established one. It was so also with England, but the English tanner was driven out of it through sheer competition, and of course non-protection.

Q. Do you buy and collect in the mofussil?—A. I have a firm in Cawnpore and one in Dacca who buy for me. I don't collect in the mofussil; that is really the hiparies' work.

Q. You buy in central places like Cawnpore?—A. Yes, and Dacca; chiefly in the Calcutta market.

Q. You sort and select here?—A. What we buy we buy all round, and divide everything up in our godowns, first in respect to quality, then weight; and then we ship.

Q. Are hides sold according to marks in London?—A. They are sold according to shipping marks and especially with reference to under marks or quality marks of the goods. To give an example. I have got a bunch of hides here (indicates on the table). This I call top selection "A," this is "B," this "C" and this "D." All have different values and each has different weights, extra heavy, heavy, medium and light, which again have different values, the sub-selection figures on the bale shipped, and you then get your price for it. This man takes only lights, another man will take the rubbish, *i.e.*, the rejections of a given weight. That is how the trade is done. Since the war a great deal has been done in all-round selling, *i.e.*, I say I have four collections here. Someone says, "I will take those 20,000 hides together." That is quite an innovation and did not exist in pre-war times. When the war is over, people will be more fastidious; they will not buy everything. Some of our customers willingly do it, but only big men can do it.

Q. In normal times the sales are made by auction in London?—A. Hides are sold in London by auction, not here in India. That I don't believe could ever arise, because as I say, hides are sold all round. To value them and sell them by auction would be a very difficult process.

Q. Does the same system obtain in New York or Scandinavian ports?—A. In buying selections?

Q. Yes, and are they sold by auction?—A. The business starts this way. A man sends me an enquiry; I make the man a firm offer; I say I have got 20,000 hides, and I give a rough description of what they contain. Then I say, "This is my price," and the man says "All right, I will take them or will not take them." If he takes them, it is a bargain. If he does not take them, I try and sell them to another man. Before shipment they are selected and baled up and the man gets the bales of hides of different weights, and he keeps them, telling me to draw on his bankers. I sell my bill to the exchange banks here; then I am paid, and this transaction is closed. If I have shipped anything below my standard, I am subject to arbitration in America or England. This customer of mine would say, "You have not shipped quite up to your standard." Two brokers have seen it, your own agent too. They have decided so and so. Then I have erred and have to abide by the award whatever it may be. That is how the business is done.

Q. But I understand you sell in Calcutta?—A. Very rarely; sometimes one firm sells to another; that happens.

Q. Regularly?—A. No, only now and then. What I buy here I sell to Europe or America.

Q. And you pay shipping charges?—A. Yes. To some people I sell c. i. f., to others c. & f. The Americans generally buy c. & f. When the war started they had to buy c. i. f. and war risks, because banks would not take the documents differently. They wanted complete collateral security. The American buyer arranges for insurance and war risk. To Italy and London we sell c. i. f. and war risk.

Q. You have no difficulty in getting whatever banking facilities you require?—A. Not in the least.

Q. From the exchange banks?—A. The exchange banks take our drafts or bills. All the business is financed through London bankers.

Q. Do you find that the business requires a considerable amount of capital?—A. It does. You cannot do a hide business on a small capital, because you lock up a great deal of money. For instance it would be of no use for a man to attempt the hide business who could only say "My capital is half a lakh of rupees." He could not move; he must have several lakhs. Having that, the banks would assist him further. Banks are very good here.

Q. Would you say that command of ample capital was one reason of the German success?—A. No, because what a German could do, as far as capital is concerned, any Englishman could do. No, their success was due to the fact that they took up, in the early days, a line of business which the average Englishman would not touch, and turned up his nose at.

Q. However, you do not see any reason at all why the whole business should not pass into British or Indian hands?—A. I see no reason, if they apply themselves to it. There is no

reason whatever why British firms should not get hold of a big slice of the business. I am speaking now of shipments to foreign countries, excluding Germany and Austria.

Mr. A. Chatterton.—Q. Can you tell me what becomes of the skins that are available in the same areas as the hides are drawn from which are brought to Calcutta?—A. Yes, more or less; wherever the hides come from the skins are also collected.

Q. Do they come down to Calcutta?—A. A good many, not all. Everything comes to Calcutta from Eastern Bengal, Orissa and part of Central India. Those collections are sent to this market; also from Darbhanga, Muzaffarpur, Bihar, etc.

Q. From the more Northern districts do they go down to Madras and Bombay?—A. From the Northern district they go to Karachi. From Cawnpore, in the United Provinces, the skins are either sent to Calcutta or shipped *via* Bombay, according to the freight. The freight determines that.

Q. Is there any pickling done in Calcutta now?—A. Not what Madras calls pickled. There are two classes of skins, dry-salted and wet-salted. Wet-salted are the green skins salted with table and khari salt and then shipped. Pickle is some chemical substance, whitish in colour was used a great deal in Madras and was called the pickled skin.

Q. Pickling is not done at all here?—A. Not here.

Mr. C. E. Low.—Q. Have you had any experience of the up-country slaughter market trade, as in Agra and other places?—A. No, I have not been there. I have been in Cawnpore buying hides in the open bazar.

You speak of buying from small firms up-country. As you know in these large slaughter yards there were Germans originally, purchasing the hides from the butchers. Were those men employes of exporting houses in Calcutta, or a separate organisation?—A. No, there were branches of Calcutta exporting houses there. Schroeder Smidt & Co. had a big branch in Cawnpore and used to buy largely from slaughter houses up-country.

WITNESS No. 107.

J. Goodman.

MR. J. GOODMAN, *Messrs. Anderson, Wright & Co., Merchants and Agents, Calcutta.*

WRITTEN EVIDENCE.

industry.

The silk industry, which in the days of the East India Company, was one of the most flourishing in Bengal, has gradually declined until it is of very small dimensions as compared with what it used to be. In fact the production of silk in Bengal is now so small that, after the needs of local buyers have been satisfied, there is very little raw silk left over as available for export. Now-a-days even the local buyers do not confine themselves to silk made in India but import considerable quantities from China and Japan.

The Governments of other countries, such as Italy, France, Japan and Hungary have for many years past been spending large sums of money on their respective silk industries, recognizing as they do that the industry is one which requires special help and which is a valuable asset to the country.

The Bengal Department of Agriculture has for some years interested itself in the industry and grants of money have been made by Government with the object of arresting, if possible, the decline of the industry and bringing it back to its former prosperous state, but in my opinion Government should do considerably more than they have been doing in the past.

It is the general opinion of those interested in the industry that this decline is due to two main causes—

- (a) to the prevalence of disease amongst the worms,
- (b) to the fact that, owing to the inherent nature of the indigenous cocoons, Bengal silk is greatly inferior in quality to that produced in Europe, China, Japan and other countries and consequently fetches a much lower price.

As regards (a) the policy of the Department of Agriculture (under the recommendation of the Bengal Silk Committee) has been the establishment of Government nurseries for the supply to the rearers of disease-free silkworm eggs. The Silk Committee were of the opinion that what was wanted was that Government should ultimately establish sufficient nurseries to produce all the eggs necessary for the requirements of the province, so that whenever a rearer wanted eggs he would go to one of the Government nurseries for it. A scheme was drawn up for the establishment of 19 nurseries, and a start was made with building them. But as soon as the European War broke out all the work was stopped and later the Director of Agriculture gave it as his opinion that instead of proceeding with the nurseries, equally good results would be obtained by distributing eggs produced in the existing nurseries amongst certain selected rearers, who would in their turn rear the worms and sell the resultant eggs to the ordinary rearers. Under this scheme it was intended that the selected rearers should, as far as possible, be under the supervision of the Sericultural branch of the Department of Agriculture, but I am most emphatically of the opinion that such a scheme, though good enough in itself under present conditions, can in no way take the place of the original

scheme for the establishment of nurseries directly controlled by Government. I consider it a matter of the greatest importance that the building of the nurseries should be proceeded with as soon as circumstances permit. As stated above, other countries, and more especially Japan, spend large sums of money on the development of their silk industries and if any real good is to be done in Bengal the annual grant for sericulture should be largely increased.

As regards (b) the Government of Bengal in 1912 appointed a French sericultural expert (M. Lafont) to make researches with a view to helping the industry by improving the existing races of silk worms in Bengal by cross-breeding or other methods or by introducing suitable races from other countries. Unfortunately after about a year's service this gentleman's health broke down and he had to return to France. At the end of 1913 another French expert (M. Grangeon) was appointed, but when the war broke out he was recalled by his Government for military service. During the short time that these gentlemen had the opportunity of studying local conditions they both did much good work and made some useful suggestions. Neither of them, however, had time to get beyond the experimental stage, and much remains to be done, more particularly in the direction of testing the ameliorated races on a large scale and under the conditions under which the worms would be reared by the ordinary rearer. I am of opinion that it is highly desirable that M. Grangeon should be re-appointed as soon as his services can be spared, or if he is unable to return that some other expert should be appointed in his place.

At the present time Miss M. L. W. Cleghorn is also conducting extremely useful experiments in cross-breeding at Alipur and I recommend that Government should continue to give her a sufficient annual grant to enable her to carry on her experiments on a proper scale or better still employ her as a Government servant for that purpose.

I would add that I regard the question of the appointment of a properly qualified European expert, as the head of the sericultural operations in Bengal, to be one of extreme importance to the welfare of the industry. I consider that if such an expert had been appointed in 1906, when the appointment was recommended by the Oldham Committee, the industry would probably now be in a much more flourishing condition than it is at present. I believe that M. Grangeon would be an ideal choice for this appointment. Not only is he a sericultural expert, but I believe him also to be a capable organiser; he organised the silk industry in Madagascar, which I understand is now doing very well. The experience which he already has of Bengal is also in his favour. I do not think that more than a short time would be required for him to determine which of the various ameliorated races, with which he was experimenting before he left, are most likely to be successful, and as soon as he had completed those experiments he could go on to the more important work of organising the industry in Bengal as a whole on modern and scientific lines.

ORAL EVIDENCE, 5TH DECEMBER 1916.

Mr. C. E. Low.—Q. Will you kindly explain what is your precise connection with silk in this part of the world?—A. I am a partner in Messrs. Anderson Wright & Co., who are the owners, or rather part owners of the Rose Filature Concern, which at present is the only European concern reeling silk in India. A few years ago there were several European firms in the trade.

Q. Where is your place of manufacture?—A. We have several filatures in different parts of Bengal,—in Murshidabad principally.

Q. How do you purchase your cocoons?—A. The system is that each filature has a number of paikars, a sort of broker, who go round to the different villages and buy from the rearers, from people who rear worms in the villages.

Q. Are these rearers of any particular caste?—A. No. A great number of them are Muhammadans. I do not think there is any particular caste.

Q. Do the paikars give these men any advance?—A. Sometimes they do. The paikar deals with the rearer himself.

Q. You do not see much of the actual rearer himself?—A. Practically nothing. We buy cocoons.

Q. Do these men carry on any other occupation, such as cultivation, in addition to this rearing of cocoons?—A. I think they do in some cases. They are not always entirely devoted to silk rearing. In Europe where there is only an annual crop the silk industry is a subsidiary industry. They rear that in the spring and during the rest of the year they do other work.

Q. Do you do anything to help these men to get seed?—H. We have tried at different times. For many years we have carried out various experiments of our own in the way of importing seed from Europe.

Q. You purchase cocoons by weight?—A. It is a very complicated system. Cocoons are purchased sometimes by the kahon—number,—and sometimes by the weight system. They weigh a certain number of cocoons and count them. The system of purchasing varies from place to place. In some places they buy by the maund, and in other places by the kahon.

Q. Of course the production is falling off?—A. Enormously.

Q. Are the prices increasing?—A. The prices at the present moment are higher than they have been for a number of years. I think the cause of the great decline in the industry is

disease first, and secondly, the quality of the silk grown here is inferior. The breed of silk worms reared in this country is much inferior to those of other countries, say, Europe, and Japan. Disease is really at the bottom of the whole thing.

Q. I should like to know whether the disease has got worse and whether the production of better qualities of silk in larger quantities in other places has caused a decline in the demand for Indian silk?—A. The quality of silk produced in other countries is steadily improving. Also pebrine is the great disease among silk worms. The pebrine disease almost wiped out the French industry in the sixties until Pasteur found the great remedy for pebrine. In France pebrine is now absolutely negligible. There is practically no pebrine there. In this country it is dreadful.

Q. With regard to the demand for Indian silk, is the price of Indian silk less than what it used to be?—A. Silk varies so enormously that it is a very difficult question to answer. You will find a complete set of figures given by Mr. Anson. You will find enormous variations. At the time of the great crisis in the silk industry in Europe prices went up very high and that naturally stimulated production here. There was a tremendous demand then for Indian silk. In those days Japan was producing a very small quantity of silk. In 1888 Japan exported 25,000 bales of silk and she is now exporting 200,000 bales of silk. Not only in quantity, but in quality also they have improved. We have remained steady without making any advance at all in quality.

Q. Turning to your specific recommendations you state that the Bengal Silk Committee recommended that ultimately all the seed required for the province should be produced by the Government nurseries?—A. Yes.

Q. Are Government able to produce disease free seed at present?—A. I do not think it is absolutely disease free—I mean free from the pebrine disease. In the silk trade when they talk of disease free seed they mean pebrine free seed.

Q. Is it not the case that the means of securing freedom from pebrine in a seed which are applicable to Europe are not necessarily applicable to this country?—A. That is a question that has very recently been raised by Mr. Hutchinson of Pusa. I may explain to you his reason for that. The Pasteur system is to examine the crushed body of the moth microscopically. The bodies of each pair of male and female moths are kept together—that is what they call the cellular system of selection—and then the body of the moth is crushed and examined. In Europe where they have an annual crop they have ten months to do it at their leisure. Here we have a multivoltine breed. There is very little time between the laying of the eggs and the hatching of the worms to do the examination and Mr. Hutchinson thinks that a pebrinised moth may easily be passed as a disease free moth, and he has suggested a way of getting out of that difficulty. Instead of testing any part of the body of the moth the head of the moth should be pulled off and the intestine drawn out and that part of the moth examined, and that will give a very much better test than the present system.

Q. Who are the people who will do this examination?—A. Men trained by the present superintendent of sericulture. They get very small salaries of Rs. 15, 20 or 25.

Q. Do anybody inspect them?—A. Mr. Ghose is the Superintendent of Sericulture and he has a certain number of people under him who go round and inspect these places, but they are on very small pay.

Q. You say that a scheme was drawn up for the establishment of 19 nurseries. How many nurseries are actually working?—A. Seven at present.

Q. Do they produce seed which is appreciably free from disease?—A. I think, on the whole, it is fairly free from disease.

Q. Do they charge any higher price for their seed?—A. They try to get a little more for it. They get a certain grant from Government and they sell the produce of the nurseries. The idea is that the nurseries should be as self-supporting as possible. The thing has done good undoubtedly. What I maintain is that it has not done work on anything like the efficient lines on which it should have been working.

Q. Freedom from disease would not improve the quality of silk?—A. No. That is why we have recommended for a long time that a properly qualified expert should be brought out, from France preferably, because there is a great industry there, to study this question, and we succeeded in getting a man. First Mr. Lafont came out in 1912, but unfortunately his health broke down and he had to go away and then we got M. Grangeon who had been for several years in Madagascar where he reorganised the silk industry, but unfortunately he was called away by his country as soon as the war broke out.

Q. These cross-breeding experiments which Miss Cleghorn is conducting, in what direction is she working?—A. With the idea of producing a better breed of silk worms. She is trying to produce a cross breed between the European breed and native breed. It will be polyvoltine. It is very difficult to get the natives here to take to univoltines. They are accustomed to the polyvoltine breed. Mulberry grows all the year round.

Q. She wants to get the quality of the European breed while maintaining the multivoltine character?—A. As near as she can.

Hon'ble Sir F. H. Stewart.—Q. Assuming that you have disease free seed and there is an improvement in the quality of cocoons, do you think that India will be able to compete with other countries?—A. Yes.

Q. As far as the Indian requirements are concerned or for export trade?—A. For export trade. As a matter of fact, there is a special demand for Bengal silk which is used for certain special purposes. The Bengal silk—I am talking now of the indigenous polyvoltine breed—is very brilliant and has a very bright lustre and it takes black dye very well, and in the old days it was and still is used largely for silk hats, though silk hats are rather going out of fashion.

Q. These experiments that Miss Cleghorn is conducting—how long have they been going on?—A. For a great number of years. Mr. Cleghorn was conducting such experiments for thirty years.

Q. Are they not carrying out experiments in Pusa in cross breeding?—A. I think that is quite on a different scale altogether; and I understand from Mr. Lefroy that they have done nothing.

Q. Has there been any practical result from these experiments?—A. As far as I know, none. But they have not been tried on anything like the scale on which they have been tried by Miss Cleghorn. She has a definite breed.

Q. You make a suggestion with regard to the appointment of a properly qualified expert?—A. That is for Bengal.

Q. Not Imperial?—A. Mr. Lefroy has a much bigger scheme for that, that there should be an Imperial silk department. That is to cover not only Bengal but Mysore and other places in India.

Q. In your opinion do the conditions and problems vary very much in different parts of India?—A. They are different. Take, for instance, Kashmir. The conditions there are totally different from Bengal.

Q. Which would be the better of the two?—A. Mr. Lefroy's idea of a silk institute is a very big thing. I think from the conversations we have had that he still has an idea that there should be a Director or Deputy Director of Sericulture for each province.

Q. The 19 nurseries are for Bengal?—A. Yes. I am dealing with Bengal entirely.

Q. Can you estimate roughly what amount of money Government should expend in Bengal initially and by way of recurring expenditure?—A. There was an estimate drawn up and put before Government. A complete scheme was drawn up with estimates of the exact cost of the whole thing. As far as I could recollect, it came to about three lakhs of rupees in regard to initial cost. If the nurseries are successful they should become self-supporting.

Q. Your silk man should be an expert?—A. That is where we have failed.

Q. He cannot be an ordinary business man?—A. You mean the superintendent?

Q. Yes.—A. There was a suggestion of that kind made at one time, that there should be a superintendent as well as a scientific man, but whether that is necessary or not I cannot say. If we could get Mr. Grangeon I think we would have a man who would do both administrative and scientific work.

Q. Anyhow you want a scientific man very much at first?—A. That is where we have been groping in the dark for the last thirty years, trying to do ourselves what we should have got other people to come and do for us.

Q. Trying on a small private scale very highly scientific and technical work which ought to be done on a really large scale?—A. The origin of the Silk Committee was entirely private. The original Silk Committee was started in 1888 or thereabouts. In those days there were several silk filature concerns. We started in a quite small way, each of us subscribing a certain sum of money and we started making experiments, and Mr. Ghose was brought in, but he is not what you may call a properly trained scientific man. What he knows is mostly what he picked up in the course of these years.

Q. Have you still your Committee?—A. After the Oldham Commission the Government practically took over the work though there is still a committee. The Government began by giving a yearly subsidy to the old committee. The Oldham Commission recommended that the Government should take things over themselves and subscribe a good deal of money and that an European superintendent should be appointed and things done much more thoroughly. An European superintendent was never appointed and they went on building more nurseries and the Government subscribed more money. But we have gone on without that scientific help which is absolutely necessary if really any good purpose is to be served.

Q. If your recommendations are complied with can you say within how long practical results may be expected for the benefit of the trade?—A. It is very difficult to say. You must take the mercantile aspect of the case into consideration. On the top of a high market like we have just now for silk you would find the thing spread like wildfire.

Q. In normal times?—A. It is a question of rupees, annas and pies to put it plainly to you. With these diseased eggs the rearer starts rearing, he spends his time on the work and his money in buying mulberry leaves and this goes on until about the fourth moult, when the disease breaks out and half his crop is wiped out by it, or even three-fourths of his crop. He loses his mulberry if he grows it himself or his money if he has had to buy it.

Sir D. J. Tata.—Q. Have you any knowledge of the work that is being done in Mysore in sericulture?—A. No; I have never been there.

Q. I have visited the silk farm in Bangalore once or twice. I understand that the Mysore Government arranged for schoolmasters from the various villages, where the worms were being reared, being sent to this so-called school of sericulture in Bangalore and trained them to the use of the microscope to examine either the eggs or the blood of the moth, and after they had learnt this sort of work they were sent to instruct the villagers in places where this rearing of worms was carried on. In this way the villagers were taught to rear a healthier kind of worm?—A. They tried the same thing in Bengal, but it was done only in a half-hearted way.

Q. The village schoolmaster can be taught the use of the microscope and learn to examine the seed?—A. If he is shown what he has to look for. All that the man who is using a microscope has to do is to look for pebrine corpuscles.

Q. There was an exhibition in Bombay recently of the silk products of the Bangalore farm and we were told that the silk now produced by the Salvation Army in Bangalore, who are in charge of the farm, was realising a very big price—a much higher price than what it used to realise in the old days?—A. There are enormously high prices just now.

Q. I think that was before the war and we were told that they had succeeded in improving the quality of silk and not only that, but that they were getting a little more silk out of the cocoons than they used to in the old days?—A. Yes.

Q. Has that been found possible here? Has any improvement being noticed here in the quality of the silk and the production?—A. The quality of our silk has not fallen off, but other countries have improved theirs immensely. From the records in our filatures we find that we are getting as much produce now out of the cocoons as we got many years ago and as much weight of silk. There has not been what you might call actual deterioration in the quality of cocoons.

Q. I understood that the quality of the silk was better in some way in Mysore?—A. Probably they are reeling on more modern principles.

Q. Probably due to cross-breeding; because I believe that experiments in cross-breeding were carried out—with what success I do not know?—A. I do not think that experiments in cross-breeding have been carried out to such an extent as to put the products of this cross-breed on the market. I have never heard so.

Q. We were shown cocoons of the pure French moth, the Italian moth and cross-breeds all showing difference in shades, the European was white, the indigenous yellowish, etc.?—A. An enormous number of cross-breeds have been made, but they have never got beyond the experimental stage. It is not done in Bengal on what might be called a commercial scale. It has not got beyond the laboratory. I think that if we could get over this difficulty of disease and introduce a breed superior to the present indigenous breed, there is a great prospect for the silk industry in Bengal.

Q. Or the rest of India?—A. I am speaking of Bengal. I have no experience of the rest of India.

Q. Mulberry can be grown pretty easily in a great number of places?—A. Yes.

Q. And as you say you can get a crop all the year round?—A. In Bengal.

Q. In the south, Bangalore, Mysore, Belgaum also. India was at one time the headquarters of the silk industry?—A. Yes.

Q. If the whole thing could be revived it would be very useful?—A. Yes.

Mr. A. Chatterton.—Q. Do you consider that the silk industry in Bengal as regards methods of sericulture and reeling is in a primitive condition, compared with Italy and France?—A. Are you referring to the rearing of silk worms or manufacture of silk?

Q. Both?—A. The system of reeling in Bengal seems to be the best system for reeling indigenous cocoons. Different firms at different periods for the last 20 or 30 years or more have tried to introduce improved machinery. We ourselves have done so. Some years ago we laid out a considerable sum of money in getting out reeling and re-reeling machinery, but we found that it did not work with the indigenous cocoon. The ordinary system in vogue now in Bengal is found to work better than anything else so far with these cocoons. If we had a better class of cocoons, of course, better machinery could be introduced. Reeling is practically handwork here.

Q. Do you employ Europeans?—A. We have two Europeans at present. We have not one European for each filature. A filature is not a big concern. We have a good number of filatures. In one filature we have 400 basins and in others we have 60, 70 or 100 basins.

Q. How long is the interval between one crop and another in Bengal?—A. We have three main crops in the year, which we call the November bund, the March bund and the July bund, or the cold weather crop, the hot weather crop and the rainy weather crop. In between these, we have what we call seed crops. There are two main varieties of worms, i.e., chotapoloo and nistri. Nistri does very well in the rains and chotapoloo in the cold weather and hot weather. In the rains the nistri gives you a very good cocoon to work with. In the cold weather and the beginning of hot weather the nistri cocoon is a papery thing. In between the main bunds they rear for seed purposes for keeping the crops going.

Q. Can you say what percentage of the crop is lost through pebrine?—A. I cannot tell you. I have no statistics.

Q. Does it amount to a half, or one-third or three-fourths?—A. I cannot tell you.

Q. If we were able to eliminate pebrine by how much would silk production increase at once?—A. The way it would increase silk production is that people would get good crops. It is very discouraging to a man to find half his work gone after he has spent his time and money on it. Sometimes he gets a small crop or no crop at all. At other times he gets a fairly good crop. There are native seed rearers who produce cocoons for seed purposes and they get better price for these than by selling to the filatures.

Q. Have any attempts been made, apart from eliminating the diseased seed, to improve the rearing houses?—A. Some attempts have been made under the supervision of the superintendent of the nurseries. These nurseries are supposed to be model rearing houses and at various times the Bengal Silk Committee have tried to help the rearers by giving them thread nets and encouragement in different ways, to improve their rearing houses.

Q. Have they been adopted?—A. I do not think they have been adopted to a very great extent. At present, there is an idea to get these men to rear very carefully under the eye as it were of the superintendent of the nurseries. It is very difficult to get them to use anything.

Q. Would you put the whole question of rearing seed under the supervision of the State?—A. My idea at present is that the two things should be worked together—introduction of a better breed as well as production of disease free seed. Some people treat the two problems as quite distinct. There are some people who will tell you that the present indigeneous breed is the one which suits the country best, and that if we can get it pure and free from disease we will get along with it all right.

Q. Do you know what is the difference in weight between the ordinary European univoltine cocoon and Bengal cocoon?—A. There is a very great difference in weight. All that difference in weight is not in silk. The chrysalis in the European cocoon is heavier than that in the native cocoon.

Q. In the length of the thread?—A. A very good European cocoon will contain three or four times as much silk as a native cocoon.

Q. So that four native crops will bring as much as a univoltine crop?—A. But you can keep a larger number of native worms with the same amount of mulberry. Univoltines have never been reared in this country on a large scale but only on an experimental scale, and I am afraid I cannot give you any reliable figures on that point. An European worm eats a great deal more mulberry than a native worm. It is a much bigger worm. One of the objections with the natives have to the univoltines is that they eat too much and the rearer cannot have the same number of European worms in his rearing house, because they are big and take up so much more space.

Q. Would it be any advantage if you started conditioning houses as they have in France and Japan?—A. I do not think we have got to that stage of development. You must have a fairly big trade to pay for conditioning houses. We export most of the silk that we reel, but we also sell some of it locally.

Q. At present the weaver is in a very bad position in dealing with the Indian silk because it comes to him in a form which he cannot use?—A. We brought our re-reeling machinery and put it in some of the filatures,—in four filatures,—but we found we could not get a proper price for the re-reeled silk. The difference in price between the re-reeled silk and the raw silk did not pay us to re-reel and so we dropped re-reeling.

Hon'ble Pandit M. M. Malaviya.—Q. You say that the decline of the industry is due, one, to the prevalence of disease among worms. Does the disease prevail now to a larger extent than before?—A. There are no statistical except that we know that the industry has gone down enormously.

Q. You therefore infer that one of the causes is the prevalence of the disease?—A. It cannot be anything else.

Q. For how many years have you been in this industry?—A. About 28 years.

Q. During this experience of yours has the disease been on the decline, or has it been spreading more and more among the worms?—A. The silk industry has gone down enormously during that time. Whether the percentage of disease is greater or not I cannot tell you.

Q. There are no statistics by which one can go, nor have you gathered any information from the rearers of cocoons as to the extent of the spread of the disease?—A. The information to be got on that subject is very unreliable. The best set of information you can get on that subject is the evidence taken by the Oldham Commission, and you will see what a variety of opinions they got. They went through every silk district in Bengal and took evidence from rearers, pickers, mulberry growers, etc.

Q. There are no reliable data then to support the view that the disease is prevalent to a larger extent now than it used to be, say 20 years ago?—A. I do not know that it varies. Let us say that the percentage has not increased, but if it continues and the rearer continues to lose a certain percentage of his crop he gives up the industry.

Q. You say that the Department of Agriculture has interested itself in the silk industry. Have any special efforts been made to destroy or check this pebrine?—A. That is what I have been describing in connection with the Government nurseries. That is run by the Bengal Government.

Q. But you think there should have been more done in that direction?—A. Much more should have been done. What has been done has done good. Probably if it had not been done at all, the silk industry would have been dead by this time.

Q. The second cause of the decline of the silk industry in your opinion is the inherent nature of the indigenous cocoons?—A. That is a matter of my personal opinion.

Q. You have had opportunities of comparing the Bengal, the European, the Chinese and Japanese silks?—A. Yes.

Q. You say that the Bengal silk is greatly inferior in quality. In what respect, in respect of strength and durability?—A. In many respects. The indigenous cocoon gives only about one-fourth of the length of thread. When reeling from this cocoon the threads are continually giving out and the reeler has to keep throwing on new threads. Therefore you cannot get the same regularity and strength in the silk. You cannot get the same cleanliness. Every time a new thread is put on, it makes a sort of hook which to the naked eye looks like a tiny bit of fluff on the thread of silk. All these things tend to make the price lower. The price of Bengal silk is steadily below the price of Japanese, French, Italian or Hungarian silk.

Q. How do the Japanese silk and the Bengal silk compare in point of strength or durability?—A. The Bengal silk is not so regular and it has not so much tenacity as the Japanese. The Japanese produce very good silk. They have univoltine worms. Their main crop is of the univoltine breed.

Q. You say that M. Grangeon organised a silk industry in Madagascar which is doing very well now?—A. That is what I understand.

Q. How many years did he take to establish it?—A. He was three years in Madagascar and he evolved in that time a polyvoltine breed from a univoltine breed. We have had samples of it and if we could succeed in introducing this Madagascar breed here it may be a most excellent thing for Bengal, because it is a polyvoltine breed.

Hon'ble. Sir Fazulbhoy Currimbhoy.—Q. Do you know that the shipment of Chinese silk is increasing every year?—A. I believe so.

Q. Have you any statistics?—A. It comes mostly through Bombay. We do not import it.

Q. Don't you think that the Chinese are able to sell their silk cheaper than what you can produce in India and therefore it is one of the causes why our trade is declining?—A. I believe that a good deal of the Chinese silk—the Canton silk—is of a very low quality.

Q. It is the Shanghai silk that comes in largest quantities. It is coming in very big quantities and we are now competing on this side too in a very large measure, and they are selling very cheap because the finer stuff goes to France and other countries and only the cheaper stuff comes to India. But if India wants finer qualities she could get them. The silks from China that are coming into India are all rejections. Do you think that the cheapness of that silk is one of the causes of our decline?—A. I do not quite see how that will affect our export. Take our filatures. We work for the European market principally, and therefore the fact of cheap Chinese silk coming here would not affect the price we can get. If the rearer gets a full crop it pays him.

Q. Do you think that if everything is done by the Government about the disease it will pay?—A. Yes. If the rearer gets a full crop he gets money out of his cocoons. If he spends money in buying mulberry to feed these worms and he gets a half or one-fourth crop, owing to his worms dying from disease, he loses his money.

Q. I only wanted to know from you whether you have studied that China and Japan are selling cheaper than you? That is the chief point. With a larger production would you be able to sell cheaper?—A. If a man gets a full crop. Generally pebrine develops in the last stages. The whole of Pasteur's system is based on this, that if you have a pebrine free egg there is no germ of disease in the worm when it is born and even if that worm contracts pebrine subsequently it will generally spin a cocoon and probably a good commercial cocoon. But if you start with an egg which is infected and the worm is diseased when it is born, the pebrine will develop and kill the worm before it can spin a cocoon. Generally the disease gets bad and develops and kills the worm late in the life of the worm so that, after the rearer spends money in feeding that worm, it dies when it ought to be about to spin a cocoon. If the rearer gets a full crop he can afford to sell his cocoon at a cheaper price and yet make a profit.

Sir D. J. Tata.—Q. Is there any reeling done in the cottages or do the people only breed cocoons?—A. They reel also.

Q.—They are all home-made reels?—A. Every one. The cottage-made silk and the silk made in small native filatures is the silk you are referring to. That is the silk which will come into competition with the cheap imported silk.

Q. What is the pattern of the reels?—A. The old Bengal pattern.

Q. Do you know anything about the Japanese pattern that has been introduced in Mysore?—A. Yes.

Q. You tried them here?—A. Yes. The Japanese reel is a very small reel and from that they re-reel on to the standard reel which is about 54 inches.

Q. It is supposed to be an improvement on Indian-made reels?—A. Yes.

Q. About the boiling of the cocoons—is there any difference in the methods employed in Europe, Japan and India?—A. In Europe the boiling of the cocoons is done in a separate basin from the reeling. The cocoons have always to be reeled from the hot water basin. In Europe and Japan too, they steam the cocoons first in a separate basin and then they are taken from that basin and put into the basin in which they are to be reeled. In Bengal the two processes are done in the same basin.

Messrs. H. A. F.
Musgrave &
H. F. Davy.

WITNESSES NOS. 108 & 109.

- (1) MR. H. A. F. MUSGRAVE, *Superintendent of Local Manufactures and Government Test House, Calcutta.*
- (2) MR. H. F. DAVY, A.M.I.C.E., *Officiating Superintendent of Local Manufactures and Government Test House, Calcutta.*

WRITTEN EVIDENCE OF MR. H. A. F. MUSGRAVE.

I wish only to state my views on some of the points which have not been touched or only briefly by Mr. Davy, the Officer of my Department, who officiated for me during my 6 months' absence in England.

This Department is in close touch with a very large number of existing firms who manufacture material used in engineering generally such as bridge and structural steel work, castings, cement, coal, oils, paints, etc., and it has struck me that the lack of progress or the failure of an enterprise is due, more than from any other cause, to the fault of the manufacturer through bad workmanship, or the selling of material of inferior quality so that before any Government financial assistance is given this question should be carefully looked into. On the other hand I think that Government assistance should not be withheld when an existing enterprise is retrogressing owing to want of capital, or support, due to the falling off of revenue provided such retrogression is due to unforeseen circumstances over which they have no control.

The support Government can give varies considerably, but in the majority of cases the assistance can be given by financial support, by loans, at small interest, or by increased purchase of the manufactured article, rigid inspection being insisted on as a source of control.

I think not only Government railways but companies' railways, and municipalities, who are the largest purchasing bodies in this country, could with advantage to themselves guarantee to purchase, up to a limited amount, certain articles in this country from local firms provided that the quality of the article is up to a recognised standard and a satisfactory price and rate of production is assured.

One of the best examples of this nature is cement upon which subject the Officiating Superintendent has written. Large firms are in existence in this country, which manufacture cement up to the standard laid down by the British standard specification, and Government tests can be obtained at any time guaranteeing the quality of the material. In spite of this a comparatively small amount is sold in this country, buyers preferring to purchase in normal times the material at home from well established firms. This exemplifies the general feeling.

New enterprises cannot expect to be fed entirely by Government without making the initial efforts themselves. They must accept responsibilities and undertake certain risks.

On the other hand I do not consider that firms should be expected to supply themselves with costly plant, say for the building of large bridges, without some guarantee from Government or purchasing departments of other large bodies that the work will probably be given to them to justify such an expenditure. It would facilitate the purchasing of material out here, and at the same time benefit manufacturers, if all railways, not only those held by the Government, followed, as regards quality of material required for their maintenance, certain defined standard specifications, a number of which have been brought out by this Department.

If it could be arranged throughout India that purchasing departments could be centralised embracing Government Departments and companies' railways, with close connection with a central Testing and Inspection Department, much overlapping could be avoided.

A closer connection, as I suggest, is to my mind of the greatest importance, as from experience I have found that few understand our analyses of oils, cement, metals, etc. The information we receive is very meagre. For us to know the price of the material is essential (the name of the contractor can be legitimately withheld). Quality *versus* price must be balanced by some one who can interpret the analyses.

All railways would be able to reduce their stock of stores considerably if they published a list of their prospective annual requirements to be purchased in India and circulated this list to all newspapers. This list would act as a guide to manufacturers as to the large requirements of the country and the stock they could hold.

I am in accord with the remarks made by the Officiating Superintendent of Local Manufactures in regard to technical aid to industries. Except under very special circumstances, such as the inauguration of industries, involving the manufacture of raw material already produced in large quantity in this country such as tobacco, jute, sugar, oils, hides, etc., the services of experts would not be justified.

Technical aid to
industries and
research work.

There exists however a very sound body of trained and experienced men whose services could be utilised from time to time for the purpose of giving preliminary advice and general assistance.

An Advisory Committee as a tentative measure represented by a body of men nominated from the various technical laboratories and departments, and not necessarily Government Departments, could be appointed to assist in giving advice to all those requiring it.

The Advisory Committee should have a highly technically trained permanent Secretary, similar to that of the Institute of Civil Engineers and Mechanical Engineers at home, to whom all letters of enquiry should be addressed. The duty of the Secretary would be to address such members of the Advisory Committee who represent certain defined branches of science and industry with a view to obtain the assistance asked for and to classify the information when received from the various members.

Members of the Committee could be asked to sit once a year.

Research work as a whole cannot be carried on with advantage in India because—

1st.—The climate is against continuous work progressing under favourable conditions.

2nd.—India is devoid of the facilities which are present throughout England, due to lack of information obtainable from personal intercourse with other scientists carrying on similar work, and from lack of literature, and therefore a research officer is apt to waste considerable time in going over a good deal of ground which has already been exploited at home.

3rd.—Very great difficulty which has always been experienced in obtaining apparatus and re-agents for carrying on uninterrupted work.

Commercial
intelligence and
industrial journals.

Periodicals and monographs on industrial subjects are not widely spread enough in India. The tendency in this country is to ignore what any other centre is doing. One is too self-centred, distance and ignorance have a great deal to do with this

WRITTEN EVIDENCE OF MR. H. F. DAVY.

As a member of the staff of the office of the Superintendent of Local Manufactures and Government Test House, Alipore (at present Officiating Superintendent), my experience has been largely confined to the technical aspect of the questions which the Indian Industrial Commission is investigating. The ordinary work of the Department which I represent consists mainly in (a) the inspection during manufacture of various structures in iron and steel, machinery and plant, (b) the physical testing of materials used on public works and in mechanical engineering, and (c) the chemical analysis of materials or manufactures used in public works and railways.

The services of the department are also at the disposal of corporations and private persons for inspection, testing and analysis with the result that an increasing amount of work of a varied nature is being carried out.

Location and
development of
manufactories for
structural and
other materials.

Public works, whether under the direction of Government or private concerns, absorb the energies of a large number of men and play an important part in the development of the country. Excluding lime and bricks as manufactures, among the principal requirements are iron and steel and portland cement. The Tata Iron and Steel Co. have shown that steel sectional material of high quality can be manufactured economically in India; cast iron and castings are produced in large quantities and of recent years the manufacture of portland cement in quantity has been started with successful results. Steel plates have not been produced in quantity and as a result they are at present practically unobtainable. In normal times large quantities of sectional material and cement are imported. Geological Survey indicates that raw materials are available to such an extent that India might well be independent of imports of these things. Owing to the size of the country and the universal need throughout for the articles mentioned it is extremely desirable that factories producing them should be numerous and distributed in order to avoid the cost of transit for long distances from the factory to the site. Where materials which are bulky or heavy in comparison with manufacturing cost have to be conveyed by long distances the proportionate cost of freight makes it difficult if not impossible for the indigenous article to compete with seaborne imports. This will of course particularly apply in cases where the site is near a seaport or navigable river communicating with a seaport. (See note "A.")

There is then, in my opinion, considerable scope for the development of these industries in India.

Technical aid and
research.

While it appears to me to be desirable that experts should be provided for the development of certain defined industries, it does not seem feasible to establish a bureau of experts attached to a research institution dealing with the development of industries generally. The term expert is frequently loosely applied. An expert, properly speaking, is a person fully acquainted with but one branch or aspect of a particular industry. Men having a good but general knowledge of one industry or several allied industries cannot do more than give a general opinion on a subject within their sphere of knowledge. Such an opinion although useful requires to be supplemented by experts in each aspect involved before the establishment of the industry can be decided upon definitely. Hence the number of experts required for the development of even a few industries would be very large and the question arises as to how such a body would be kept fully employed and the expense involved justified.

I am therefore of the opinion that with certain exceptions the most practicable solution of the general problem is to be found in the establishment and consolidation of the technical experience already available in the country for surveying possibilities and assisting development. There already exists a by no means negligible body of trained technical men attached to various departments and by bringing such men into closer touch with each other and employing them on questions within their knowledge much, I think, might be done to assist industrial development generally. Laboratories also already exist which might be employed in a similar manner. A difficulty at present seems to be that the services of technical men are either not available for work other than that of their department or if available are not made sufficient use of. Moreover the existence and location of the most suitable advice for the purpose is frequently not known to the person desiring assistance. Even in the case of my own department which is in close touch with manufacturing we are handicapped because, although assisted by small grants, the establishment is supposed to be largely self-supporting and the existence of the testing department is not widely enough known.

It would, I think, be desirable for departments like the one which I represent to be placed in such a position that assistance might be more freely given and factories whose manufactures come within their province inspected and reported on periodically. Information as to the location of technical men and institutions whose services might be enlisted should be collected and published so that when advice is required on any branch of industry communication can be readily established with the most suitable man or department for the purpose.

So far as research work is concerned, speaking generally I am of opinion that such work is best carried out in England. Greater facilities exist and it can be carried out there at less expense.

There is no doubt that considerable distrust of Indian manufactures on the part of buyers exists, and it must be admitted that there has been in the past ample justification for this attitude. In order to allay this feeling and to give confidence in the local product, inspection and testing is considered to be of great assistance, separating as it does the inferior article from the superior, and improving quality. My department was established to secure to Government as a purchaser sound articles with I believe useful results. This practice might be extended with advantage, works inspected, samples of products selected at random by the inspector and quality certified. Such certificates of quality would I feel sure assist in marketing a sound article and tend to improve quality generally.

I am also strongly of opinion that where inspection justifies such a step the policy of guaranteed purchase of such goods should be extended, arrangements being made for purchase. periodic examination of supplies to ensure the maintenance of the level of quality.

One of the chief causes of low quality in Indian manufactures is lack of adequate supervision of the artisan. My experience is that where close supervision obtains, a product of high quality results, workmanship reflecting accurately the closeness of supervision and any variations in it. Under able supervision the Indian worker is capable of acquiring a high degree of skill in craftsmanship. There is an urgent need for better supervision (preferably European) if the quality of Indian manufactures is to be competitive with that of the imported article.

The laws affecting trade names and descriptions are considered to be anything but satisfactory in their operation and steps should be taken to remedy the present state of affairs. Our experience shows that adulteration of articles both indigenous and imported is carried on freely. This would be mitigated by certificates of quality but further action in this matter is also urgently called for to protect consumers. (See note "B.")

NOTE A.

During the three years 1912, 1913 and 1914 the total importations of cement into India averaged about 3,000,000 cwts., of which about 2,500,000 cwts. (84 per cent.) came from the United Kingdom, the balance coming principally from Germany (300,000), Belgium (250,000 in 1912-13), Italy, Austria-Hungary and Hongkong.

Since the outbreak of war, imports from Germany, Austria and Belgium have ceased and those from other belligerent countries decreased considerably but the total imports for the past year were only about 16 per cent. less than the pre-war figure.

Importations from Japan have risen from 4 cwts. in 1911-12 to 638,000 cwts. last year and those from Hongkong from 57,000 to 180,000 cwts.

The importations are distributed as follows:—

Calcutta about.	42 per cent.
Bombay „	27 „
Karachi „	9 „
Madras „	12 „
Burma „	10 „

Since the outbreak of war prices have risen about 70 per cent. and present conditions therefore are encouraging to the new industry and its development.

Certificates of
quality.

NOTE B.

For example the provisions of the Indian Merchandise Marks Acts and connected Acts where they apply to paints and materials for painting are capable of modification with advantage. Paints and pigments are very frequently wrongly and fraudulently described.

(1) Such vague terms as "Genuine white paint" should be prohibited as misleading. (2) White lead should be defined as basic lead carbonate and the application of the term to the sulphates and other lead compounds prevented. (3) The permission to describe such materials as genuine when they contain anything less than 5 per cent. impurities is unfavourable to the manufacturer of pure products. Genuine impurities are very small in amount and analysis readily shows whether the foreign matter is due to adulteration or is an accidental impurity. (4) The present rule that paints and pigments adulterated up to 50 per cent. be described as "reduced" should be altered to demand that the percentage adulteration be stated and accurate within 2 per cent. (5) "Lithopone" should be required to be marked with the percentage of zinc sulphide, as is customary in Great Britain, 1 per cent. latitude being allowed. (6) Turpentine should be described further by the name of its origin, e.g., "American turpentine." Turpentines from different countries differ widely in their characteristics.

Rules regarding descriptions of composition should be uniform for the indigenous and the imported article. Experience leads to the belief that misdescriptions are made wilfully by agents and sellers who are well aware of the nature of goods sold.

ORAL EVIDENCE, 5TH DECEMBER 1916.

Note—Mr. H. F. Davy accompanied Mr. H. A. F. Musgrave.

President.—Q. Can you tell us a little more about the organisation of your office. I understand that most of the purchases made through you are for the railways and the Public Works Department?—*We make no purchases at all. We carry out the testing of any material the railways choose to send us; at the same time we undertake inspection of structural work for railways, the Public Works Department and the Military. We have an Inspector at Kulti near Barakar, in connection with the Bengal Iron and Steel Co.'s works, an Inspector for structural work, and another Inspector for wagon work who inspect work ordered by Government and other railways, etc., manufactured at the principal engineering firms of Calcutta. We make various tests of all the work we inspect.*

Q. The Inspector who is at work at Kulti, is he a metallurgical Chemist?—*A.* He is not a chemist at all, he is simply a man who has a thorough knowledge of castings, and any tests he requires are made at our laboratory.

Q. The testing work is done by Dr. McWilliam at Kalimati for the Tata Iron and Steel Company's products; has he any connection with you at all?—*A.* No.

Q. Has Dr. McWilliam someone to pass the castings?—*A.* I don't know.

Q. Dr. McWilliam and his assistants have nothing to do with you and your assistants?—*A.* No, we run a sort of parallel department for separate work under the same head.

Q. Do you come under the Railway Board?—*A.* Entirely.

Q. Are you a member of any recognised service in India?—*A.* I am permanent Government servant belonging to the Superior Revenue Establishment of Indian State Railways. Mr. Davy came out specially to my department.

*Q. Mr. Davy.—*Are you under the ordinary Civil Service Regulations?—*A.* At present I am on contract.

*Q. Mr. Musgrave.—*You say in your note, that "it would facilitate the purchasing of material out here, and at the same time benefit manufacturers, if all railways, not only those held by the Government, followed as regards quality of material required for their maintenance, certain defined standard specifications, a number of which have been brought out by this department." How are these specifications issued to manufacturers?—*A.* They can apply for them. If you would like to see them, I will pass one or two round. The Railway Board issued a large number of them one or two years ago, and if anybody applies for them, we will give them. Most of the railways issue these specifications when they require any work to be done. All Government work is given out under these conditions.

Q. Is this extended and brought up-to-date from time to time?—*A.* Yes, it is entirely up-to-date.

Q. I don't understand what this paragraph means: "A closer connection is to my mind of the greatest importance, as from experience I have found that few understand our analyses of oils, cement, metals, etc."?—*A.* At present we work independently of the purchasing officer who sends us an article to be examined without stating its price or the use it is to be put to. In many cases it is impossible for him to interpret the report especially in chemical analyses and we are unable to express an opinion because we have such meagre information.

Q. What staff have you to do this work?—*A.* We have one senior chemist with two assistants under him. One practically does all the coal testing, and one English Physical Assistant, Mr. Davy, with two or three other men under him in the physical laboratory, and three European Inspectors doing outside work.

Q. Taking your chemists first; you have three chemists?—A. Yes.

Q. Your Senior Chemist, is he an organic chemist or inorganic?—A. His qualifications embrace both but his work is chiefly inorganic.

Q. His work is largely analytical?—A. Yes.

Q. You are doing coal assay samples, I understand; and the Mining Engineer of the Railway Board does it too?—A. We do it for him.

Q. Practically the whole of your testing work is confined to engineering material?—A. Yes.

Q. You would not be able to undertake tests of drugs and chemicals?—A. Not in general.

Q. You have recommended an Advisory Committee "as a tentative measure represented by a body of men nominated from the various technical laboratories and departments, and not necessarily Government Departments, to assist in giving advice to all those requiring it." Is that a Committee you would have formed, in order to advise anyone who wants to start an industry?—A. It is only a suggestion of mine. An Advisory Committee would be of great assistance, if they divided the men who were on the Committee into various branches, so that manufacturers could apply to the Secretary and the Secretary could write to the different branches to give whatever information the manufacturers would require.

Q. How is this committee to be maintained; are they to be honorary advisers?—A. Yes.

Q. What size committee would you have?—A. It is a thing I have not gone into very deeply. I have only just returned from leave.

Q. A committee of that kind would not be able to give you advice on, say geology?—A. I don't know; it would all depend on whether the members were chosen for that purpose. There are a lot of men who do not know where to apply to for information and if there was a permanent Secretary, who would deal with these things, they would all apply to one head.

Q. There is only one Geological Survey in India, equipped to deal with any one's geological problems?—A. It is only known to certain men of certain branches of engineering.

Q. If you multiply the number of "post offices" you will create confusion. Enquiries are now simplified in connection with geology, and yet you want another institution to refer geological problems to? Do you think there would be any advantage in forming a new committee?—A. You have mentioned a particular branch, but there are many others for which the committee would be useful.

Q. *Mr. Davy.*—Mr. Musgrave was speaking to me about this the other day, and the point he made was that this committee would be representative of all the different departments together, *i.e.*, the Geological Survey, Pusa, and various other departments would all be represented on the committee, and the functions of the Secretary would be more or less to bring into unison all these various departments where the industry affected them. But there is now a Board of Scientific Advice?—A. I have never heard of it.

Q. Had you not better get some knowledge of existing Government organisations before starting new committees? There is already a Board of Scientific Advice, composed of the heads of certain scientific departments.—A. Its existence is not generally known any more than that this department is at the disposal of any one requiring work done?

Q. It is unfortunate for the public not to have one definite department for each natural group of subjects. They would then know exactly what to refer to you and what to other departments?—A. I take it that the Metallurgical Chemist, Mining Engineer, etc., are practically under one department under the Railway Board. There is a certain amount of correspondence between us, *i.e.*, we refer questions of metallurgy, which are beyond us, to Dr. McWilliam, who is an expert, and we get his opinion, and send the report out as a whole, embodying his report and ours.

Q. As long as you are working with a man like Dr. McWilliam I know no harm is coming of it, but the want of an organised system is likely to lead to friction. If you were organised as one department under the Railway Board or Public Works Department, and had an obvious head, questions that came in could be referred either to Dr. McWilliam or to you. It would be his business to see that all branches were brought into correlation, and that the opinion expressed was the real opinion of the department?—A. With reference to the question of the work at Kulti and at Kalimati, Dr. McWilliam would be the last man to suggest that he was an expert in casting work which is what we do at Kalimati.

Q. Not Dr. McWilliam himself, but he has a staff?—A. I don't know what staff he has, but the casting work at Kalimati is a fairly recent thing, I believe.

Q. Would it not be better if this was all organised as one properly constituted department with a head to it?—A. It has worked very satisfactorily up-to-date from the time it started five or six years ago, and there is no reason to presume that we cannot get experts on any single subject if required. This department has practically started with a small testing laboratory attached to it, but it has increased considerably.

Q. Is it not time, after it has grown in this experimental way and has shown its value, for us to mould it into a regular organisation?—A. We have a budget of our own, and the work carried out does not need any further assistance than we have already.

Q. Supposing we started the testing of drugs and oils?—A. We test oils at present.

Q. You would not test drugs?—A. Generally speaking no.

Dr. E. Hopkinson.—Q. Lubricating oils?—A. Yes.

President.—Q. You would not undertake essential oils?—A. No.

Q. Referring to the Advisory Committee which you suggest, you say, "Research work as a whole cannot be carried on with advantage in India." Do you mean research work in engineering?—A. It is my opinion about research work as a whole. My department is connected with structural work.

Q. There may be a certain number of research problems in engineering which can be undertaken more suitably at home, but India is not devoid of facilities for research work, or it ought not to be. You can develop a good laboratory here if you have centralised departments, but not if you have scores of little departments. Research work is properly provided for in some of these departments which have been centralised. They have very well organised libraries and reference collections, and are well equipped. You don't mean that research work as a whole should be undertaken out of India, do you?—A. I only refer to the difficulties we have in certain research work; for instance in the bye-products of coal we would have trouble if we began research work in Calcutta where the climate is unsuitable, and intercourse with other people is difficult.

Mr. A. Chatterton.—Q. In reference to this question of cement, why is that there is a general local feeling against the use of cement manufactured in India?—A. The reason I have heard stated is that there are well-established cement making concerns at home, and therefore, people prefer to use material which has been tested for years and found perfectly sound.

Q. Do you know if Indian cement makers periodically submit their cement to proper tests?—A. We have made these tests out here for different companies in India.

Q. Would it establish confidence in the use of Indian cement if the works would make better arrangements for the regular weekly testing of their output?—A. I should think it would. We try to impress upon everybody the necessity of these tests, and that makers should send their cement to us, as we are a Government Department.

Q. Do you know whether in this particular instance the Indian cement makers are able to comply with British standard specifications?—A. They follow our specifications.

Q. Do they comply with them?—A. They have to comply with them.

Q. Because it has come to my notice that very large quantities of cement have not been found up to English standard?—A. Quite so. That is because large consignments of cements are either not tested at all or not frequently enough.

President.—Q. Would you make that test for a buyer?—A. For anybody, buyer, maker or anyone.

Q. For a fee?—A. Yes, we have a set of scheduled rates for these things.

Mr. A. Chatterton.—Q. In regard to Government assistance, you say that "not only Government railways but companies' railways and municipalities who are the largest purchasing bodies in this country could with advantage to themselves guarantee to purchase up to a limited amount certain articles in this country from local firms, provided that the quality of the articles is up to a recognised standard and satisfactory price and rate of production is assured." Why should they not purchase their whole requirements in this country, if they are up to recognised standard?—A. Certainly, but at all events a percentage.

Q. But you don't suggest that these public bodies should guarantee to purchase all that they require. Why not?—A. If they can be supplied in India certainly.

Q. I think you have said that most of the specifications you issue are British standard specifications?—A. Yes, with slight modifications due to climate and other things.

Q. Do individual railways issue special specifications drawn up by their own engineer?—A. Some do.

Q. You have nothing to do with construction?—A. A great deal in passing bridge and structural work.

Q. That is the materials?—A. Not at all. We pass the material and workmanship too.

Q. And with reference to specification for materials?—A. Yes.

Q. When these engineers prepare their own specifications, do they differ from the British standard?—A. The State railways follow it entirely. One or two other railways are following it.

Q. You say, "There exists, however, a very sound body of trained and experienced men." Whom are you alluding to in this particular instance?—A. I refer to all Scientific Government Departments in India.

Q. How do you propose that these men should be employed in this way; do you mean that these men should be allowed to do private practice?—A. Not at all. I was thinking more of the International Association for Testing Material, which is no longer in existence, that had their Secretary in Vienna, who was a paid man. Certain men dealt with certain subjects. When any question was asked the Secretary regarding certain things, he referred it to the various branches which dealt with the subject, but these men were not paid men; they simply acted in a honorary position and gave the advice required of them.

Dr. E. Hopkinson.—*Q.* Is your laboratory, the only Government testing laboratory in India?—*A.* No. There is a metallurgical inspector's laboratory at Sakchi but he deals with iron and steel analysis only.

Mr. A. Chatterton.—*Q.* Do you not recognise the testing laboratories attached to the Sibpore College. There are very complete testing laboratories at Roorkee and Madras?—*A.* I do not know about them.

Dr. E. Hopkinson.—*Q.* You are under the Railway Board?—*A.* Yes.

Q. You have no official connection with the Public Works Department?—*A.* No.

Q. You take both public and private work?—*A.* Yes.

Q. Can you give us any idea as to the relative magnitude of the two?—*A.* About 90 per cent. of our inspection work is Government work and 10 per cent. private.

In testing physical and chemical about 90 per cent. is for Government and 10 per cent. private, *vide* details below—

Inspection—Total value of material.

	Rs.
State Railways and other Government Departments	30,10,406
Companies' Railways and Feudatory States	4,94,749
Private bodies	4,908
Total average for 3 years	35,10,063

Testing—Total number of Chemical.

Physical tests average for 3 years.

	No.
State Railways and other Government Departments	3,989
Companies' Railways and Feudatory States	75
Private bodies	200
Total	3,364

Q. How many samples of cement have you tested?—*A.* About 200.

Q. What do you charge?—*A.* Rs. 64 for a complete test.

Q. Do any of the Provincial Governments or the Directors of Industries consult you?—*A.* We have never had any note from any Director of Industries since we have been in existence, which is some years now.

Q. Nor from any department of the Provincial Governments?—*A.* Very seldom; we do from time to time; the Public Works Department do.

Q. Are you consulted both as to specification of material and also as to material being up to specification?—*A.* Yes, specifications are frequently compiled by us.

Q. Can you in your laboratory test a dynamo efficiently, or a pump?—*A.* No.

Q. Could you inspect a steam boiler and license it for any particular pressure?—*A.* This is the work of the Boiler Inspectors under the Steam Boiler Act.

Q. Do the consulting engineers at home ever refer any question to you at all?—*A.* We have not had a case.

Q. You are not in communication with them at all?—*A.* No.

Q. But you are in communication—at least you know the work that is being done by the Standards Committee?—*A.* Yes.

Q. Have they consulted you at all?—*A.* Indian specifications were sent home to the Secretary of State and examined, and correspondence took place extending over a number of years before they were accepted.

Q. Are they adopted by the Standards Committee?—*A.* They are adopted out here, but if you read them through you would see that we are following the British standard specifications except in one or two cases.

Q. Have you any communication with the National Physical Laboratory?—*A.* No, I have visited it, but apart from this, we have no intercourse with them.

Q. Supposing you were in any difficulty and some subject turned up beyond your equipment would you refer to them?—*A.* We would not undertake what we could not do. If we were in difficulty we would refer to them.

Q. So far as you know, the National Physical Laboratory has done nothing for India as yet?—*A.* Not as far as I know.

Q. Has the Government of India any means of checking weights and measures?—*A.* I don't know.

Q. Can you undertake the test of electrical instruments?—*A.* No.

President.—*Q.* Have you any staff for it?—*A.* No.

Dr. E. Hopkinson.—*Q.* The same thing would apply to thermometers?—*A.* Yes.

Q. You speak of the purchasing officer of the Government of India consulting you at various times. Whom do you mean by the purchasing officer?—*A.* Railway and Public Works Department Engineering and Stores Officers.

Q. You don't know to what extent testing work is done by the universities?—A. No.

Sir D. J. Tata.—Q. You test only articles that are bought in this country for the various departments?—A. Yes.

Q. Nothing that comes out from England?—A. No. These are tested at home before export usually.

Q. When railway materials are bought for a railway and come out from England, you don't test them?—A. No, but when there is any particular case in which there is some doubt about a cement, for instance, we test it out here.

Q. In the case of iron and steel you take everything that comes from England on trust?—A. We test every bit of steel used on work under our inspection.

Q. Rails?—A. We don't touch rails. Dr. McWilliam is doing that.

Q. But the rails which have come out from England?—A. They are tested at home.

Mr. C. E. Low.—Q. I understand that your testing work is practically confined to engineering materials, to lubricants and cements; is that correct?—A. Yes, all materials used in engineering structural work.

Q. It has been suggested to us by previous witnesses that certain classes of indents which are sent to the Stores Department of the India Office, at present, might, with advantage, pass through some official in this country who is acquainted with engineering possibilities pertaining to the country, and if that were done, it would result in making existing stores rules more effective by securing a greater proportion of engineering materials and stores being purchased in this country. I am asking you with special reference to the class of article you are dealing with at present; supposing all indents for those classes of articles, before being submitted to the Stores Department, passed through your hands, do you think you would be able to point out cases in which those articles could be procured equally well, and not at unfavourable prices, in this country?—A. I wrote a letter to the Railway Board which I sent you to read. It was a suggestion I made to the Railway Board before I went on leave. I am very much in favour of that. Briefly I said that quality of material and work, and rate could all probably be arranged satisfactorily, and that therefore it would be better for us, as we have a big control over all these firms, to handle these indents.

Q. Do you think it would cause undue delay?—A. It would not cause any delay at all. We could do things quicker than anybody in the country.

Q. In cases where the indents had to go to the Stores Department, would it cause delay?—A. No, I don't see why it should. The same system was carried out in South African Railways. I was there many years.

Q. Of course you have opportunities for gaining information regarding this class of work which the executive engineers or superintending engineers could not possibly have?—A. Our inspection work is tremendously big. We have taken on the Assam-Bengal Railway, the Hyderabad lines, nearly all the Bengal Nagpur Railway engineering work, and a great deal of work from other railways, and all that within the last few years. We inspect this work, and after passing it, give certificates, and on these certificates the work is paid for.

Q. Is that work performed by Indian firms for these railways?—A. Yes.

Q. You also point out that in the converse case, where a Government official or a railway official was placing an order with an Indian firm, who, he knew, could not dispose of it satisfactorily, you would be able to tell him so, and put him on to a more likely firm?—A. Quite so.

Q. What is your staff?—A. We have three outdoor inspectors.

Q. What qualifications have those officers got?—A. They are men who have been trained absolutely for the particular work they are going to look after.

Q. Are they upper subordinates?—A. Yes.

Mr. A. Chatterton.—Q. Do you undertake tests of work that has come out to this country and failed; do they send them to you to investigate?—A. Yes. There have been certain works sent out which failed. We make whatever tests we can.

Q. Can you deal with such questions as this: some years ago a number of copper fire boxes were sent out for locomotives. They all proved failures: do you deal with questions of that sort?—A. Most certainly.

Mr. C. E. Low.—Q. Only if you are asked to?—A. Yes.

Mr. A. Chatterton.—Q. You have the laboratory equipment necessary for dealing with such things?—A. Yes.

WITNESS No. 110.

Babu S. N. Mitra. BABU SAILENDRA NATH MITRA, Proprietor of the Bande Mataram Match Factory, Calcutta.

WRITTEN EVIDENCE.

Capital.

I floated a company called the Small Industries Development Company, Limited, in 1908 and found great difficulty in raising its capital. Some rich men who were its promoters

backed out at the time of payment of their shares. The whole capital of the company was then raised from my friends and acquaintances who were all middle class men.

Several soap factories started in Calcutta by individuals with small capital have in a way killed themselves owing to price cutting competition sacrificing the quality accordingly. Two or three would have been sufficient instead of a dozen and they could have made decent profits and would have been successful concerns by this time.

I have no personal knowledge of any Indian enterprise having received any financial Government aid from the Government. I made certain suggestions to Mr. Swan when he was making assistance. enquiries about Bengal industries. In my opinion Government aid ought to be given to the existing or new Industries in the following manner :—

- (a) Loans through the bank with low interest.
- (b) Supply of additional machineries to increase the outturn of the factories on the hire purchase system.
- (c) In case of new enterprise by subscribing a portion of the subscribed capital if the promoters can raise the remainder of the capital.
- (d) By purchasing the products for a certain period.

In all cases the accounts of the company are to be audited by the Government auditors. In case of (c) Government ought to appoint directors with defined powers in the board of management of the company.

Government ought to take the lead and start demonstration factories with the raw Pioneer factories. materials available locally and hand over the same to a private capitalist or a company as soon as the experimental stage is over.

Industrial and Agricultural Banks ought to be started in each province of which Financing agencies. one-half of the capital is to be subscribed by the people of the province and the other half by Government. Government ought to keep a fixed amount each year in the banks and through them help industries and the agriculturists. The board of management of such banks should be one half Government nominees and the other half to be elected from the shareholders.

Government ought not to help any new enterprise if there are two or three of its kind Limits of Government assistance. in the province.

There ought to be a technical institute for Bengal, where the best scientific students Technical aid. of the Calcutta University will be employed in the laboratory for research work. The director of the institute should be a high class scientist of industrial reputation for a fixed period. He should be assisted in his work by a set of professors having special aptitudes in their special departments. The research work should be devoted to the production of that class of material which is imported here and made out of the raw materials exported from here. There should be a department for the rapid commercial analysis and testing of materials submitted by private individuals on a nominal fee.

To the above institute the other Government Departments, e.g., Geological, Forest, Surveys for Agriculture, etc., should send specimens of economic interest for investigation with regard industrial purpose. to their utility, usefulness and adaptability for a particular industry. The departments will then undertake to have a detailed survey of these and other materials which are found in abundance here.

To the above institute should be attached a library containing a complete set of Library. technical and scientific books and periodicals in the principal languages of Europe where the workers will get every facility to have an up-to-date information on all industrial and scientific subjects.

To the above institute should be attached a commercial museum containing samples Commercial museum. of the articles imported here and which are manufactured out of the raw materials exported from here. It should also exhibit the various stages of the manufacture together with a note indicating the capital used in the industry.

It should publish regularly a journal containing the results of researches conducted Journal. in the institute showing the possibility of these industries here. The journal might be profitably distributed free to those individuals who are interested in such industries and to industrial concerns and to public libraries.

The Department of Industries will start demonstration factories of such industries Demonstration which will be suggested by the technical institute which have been found suitable, useful factories. and adaptable to the local conditions. Such demonstration factories when found profitable and after the experimental stage is over should be handed over to private capitalists or companies willing to start the same and the results derived together with the expert knowledge available should be placed at their disposal.

Some of the best workers in the research institute after they have arrived at some Research abroad. results of some industrial importance and feasible here ought to be sent abroad to see and work in European laboratories and factories and see for themselves how they do these things and improve their stock of knowledge.

Commercial museums are useful and ought to be kept in Calcutta, Bombay and Commercial museum. Madras as stated in connection with the technical institute.

sales agency.	As the number of industries grow sales agencies will be established by others or a syndicate can be formed to take up this work and facilities through the bank are to be given to take up invoices and pay at least 75 per cent. as advance.
exhibitions.	Exhibitions are not useful and they ought to be held once in 10 years to educate the people.
government patronage.	Government Departments ought to purchase local articles in preference to imported ones and thereby give a stimulus to the manufacturers. Government officers ought to see the articles exhibited in the commercial museum and purchase the necessary articles from the manufacturers.
supply of government owned raw materials.	Government ought to supply raw materials to the manufacturers at the cost price, for otherwise it would be very difficult for small factory owners like my humble self to arrange for these. If I had got timber from Government Forest Department then I would not have closed my match factory. If the Baluchistan Government had been good enough to supply cedar wood then we would not have gone to East Africa for it.
land policy.	The Land Acquisition Act will suffice, only a section is to be added that land required for industrial purposes can be acquired by the Land Acquisition Collector at the requests and expense of persons intending to start an industry.
training of labour.	In all new factories small boys are to be taken in, say of 8 or 9 years and if they are trained then they can work any intricate machinery. In my match and pencil factories I took in Bengali boys of 8 years and they are working all the machineries to my satisfaction and are turning out the full outturn mentioned in the catalogues. I had two Europeans in my two factories and they also expressed the same opinion. No use of industrial schools for this class of people. They can be taken as apprentices in factories on nominal pay and their pay can be increased as they become useful. As regards educating them, night schools may be opened to teach them reading and writing. Some of them know how to read and write. Women also may be employed for they are intelligent and learn their work easily.
training of supervising and technical staff.	In my opinion school going boys of 8 or 9 years ought to be taught drawing, carpentry, smithy, etc., for two hours a day in the primary or H. E. schools and those who wish to have more technical training will join the industrial schools or colleges leaving the H. E. school in the Matriculation class. In the industrial school or college they will be taught such theoretical and practical subjects as will enable them to do the work of a foreman. During their stay in the industrial school or college facilities will be given to them to work in the engineering shops and big workshops and factories to learn the use of machineries. I think in this way mechanical engineers with sufficient technical knowledge may be secured. They might be given sufficient facilities to work in the research institute if they are found capable, and also in the demonstration factories at the request of a person interested in industry or at the request of the principal of the industrial college. To learn the special subject they ought to be apprenticed to a factory for two years or so and this will enable them to manage the technical part of the factory satisfactorily. The other kind of supervisor can be trained by taking in matriculates in a commercial school or college where they will learn accounts, book-keeping and other commercial subjects which will enable them to work as business manager in a factory.
official organisation.	There is no such organisation in my province for the development of industries. One Imperial Department under a single head will not be sufficient. I state below what is required and each province ought to have the same departments :— (a) Industrial and Agricultural Bank. (b) Research institute with laboratories. (c) Board of Industries to start demonstration factories. (d) Reorganisation of primary and secondary schools to enable boys to have rudimentary technical training in these schools and they will be managed by the Education Department or the University. (e) Industrial schools or colleges to be placed under the Board of Industries. (f) Commercial schools and colleges to be placed under the Board of Industries. (g) For each of the above sufficient amounts to be earmarked every year in the Imperial Budget. (h) Industrial reports and trade journals are to be issued by the research institute if possible in the vernacular of the province.
Technical and scientific departments of Government.	No organised technical and scientific department exists in Bengal except the Sibpur Engineering College. No Imperial Department sitting at Simla, Delhi or Darjeeling will be of any use to the country. Such departments ought to be started in or near Calcutta and so easily accessible to all by rail. Supreme power is to be vested on the head of each department I have enumerated above.
Commercial intelligence.	Statistics are prepared in a way on which much reliance cannot be placed for the village chowkidar is the authority from whom these statistics are collected, namely, the crop report and the price of food grains, etc., I have seen these done. As regards statistics of other things I do not know anything and cannot say anything. These statistics are published in the local Gazette in English, inaccessible to the public, and 999 out of 1,000 do not know

anything about them. The same thing can be said about the Commercial Intelligence Department.

Outside the municipal limits there are very few roads and consequently nearly 4 to 5 months in the year transporting of goods is impossible. Gradually waterways are being silted up and inland navigation is becoming daily impossible. Roads, railways and waterways.

The freight charged by railways are excessive for they charge by the marked capacity of the wagon whereas the actual weight of the goods conveyed is less. On 2 or 3 occasions I had to pay Rs. 2-1-6 per maund instead of Re. 1-6-10 quoted by the railways for wood from Baluchistan. Generally the railway companies charge excess freight and to get a refund of this one will have to wait at least one year and write at least a dozen registered letters. In one or two cases I did not get any refund. I easily got concession in freight from the Darjeeling-Himalayan Railway and did not receive any reply to my letter addressed to the Traffic Manager, Eastern Bengal State Railway, on the same subject. Railway freights.

The Forest Department ought to be worked in a business-like way. I ascertained from the Dehra Dun authorities that one class of wood can be had in plenty in the Gharwal Division. In page 42 of the Commercial Guide to the Forest Economic Products in India appears "under article 29 *Cupressus Torulossa* (Himalayan Cypress) Outturn and price:— The possible outturn is not very large but sufficient probably to meet such demands as may be made on it for the manufacture of pencils. Mr. Milward, Divisional Forest Officer, Jaunsar, states that he had 53 trees for sale in 1910 and that on demand arising that number could be trebled. The price in Calcutta would be somewhat over Rs. 45 per ton." Forest Department.

I am submitting herewith separate statements about the match and pencil factories which were started by me.

The following is a short history of the match industry in Calcutta and the difficulties which were felt about the supply of match wood for the Bande Mataram Match Factory:— Match industry.

This factory was originally started by Sir (then Dr.) Rash Behary Ghose, Kt., C.S.I., C.I.E., in 1907 under my management. *Gaon* wood from Sunderbund was used and various other woods were tried but some of them proved useless and some proved too costly. *Gaon* wood proved successful in quality and price but the dealers did not like it for the sticks become brownish after chopping, so difficulty was felt in selling them in face of Japanese competition. In 1908 I joined the factory as its managing partner and received from Mr. A. Roller of Berlin (who supplied all our machineries) by the end of 1910, sample sticks and boxes made from some Indian woods and their names. I wrote to Mr. R. S. Pearson, the Imperial Forest Economist, Dehra Dun, and he very kindly informed me that one of these woods could be had in the Darjeeling Forest in large quantity. I requested him to write to the Conservator of Forests, Bengal, about the same. On the 15th July 1911, I received a communication from the Conservator of Forests, Bengal, on the subject and in September 1911, I received two sample wagons of *Evodia* wood from the Conservator of Forests, Bengal. The Conservator failed to make arrangement for a regular supply when the wood was found suitable for my use. The Deputy Conservator referred me to *Pakhay Lall* and *Nandu Sirdars* and settled the price at 7 annas per maund (*vide* his letter No. 746-G. of the 23rd March 1912). I took from them nearly 1,000 maunds of wood during June to September 1912. I sent a representative of mine to see the Conservator and try to lower the price and find out whether any other similar wood can be had. My representative had an interview with Sir H. A. Farrington, Bart, Deputy Conservator of Forests, and he very kindly intervened and made the abovenamed contractors lower the rate to 5 annas 6 pies per maund and promised to send two pieces of another wood called *Kapasi*. It was found to be very suitable for sticks and I wrote to the Deputy Conservator about it (*vide* my letter of the 30th November 1912 and his reply of the 4th December 1912). The contractors failed to supply any *Kapasi* wood but supplied nearly 1,000 maunds of *Evodia* wood during October to December 1912, but stopped sending any from the end of December 1912 and repeated letters were sent to them but to no effect. From the stock in hand and by purchasing local *Gaon* wood and other wood and by working three days in the week I continued my work till the end of July 1913. Hence I was obliged to address myself to the Secretary, Revenue Department, Government of Bengal, on the 8th March 1913; reply to that was received from the Conservator of Forests, Bengal (*vide* letter No. 609-410 of the 25th April 1913). A comparison of his letter No. 609-410, with his letter to the Imperial Forest Economist, Dehra Dun, dated the 12th July 1911, and that of the Deputy Conservator of Forests, No. 750-G. of the 4th December 1912, will prove that either the Conservator and Deputy Conservator of Forests, Bengal, had no personal knowledge of the forest or they did not like anyone using these timbers for industrial purposes. I had an interview with the Conservator of Forests, Darjeeling, on the 5th July 1913, and he very kindly showed me a report from the Divisional Forest Officer, Kurseong, that 8,000 maunds annually of these two timbers could be had from his Division alone. I requested him to supply the required timber departmentally and he asked me to get an order from the Government of Bengal about the departmental supply and he would make the necessary arrangement.

The Hon'ble Dr. Nilratan Sircar kindly arranged an interview with the Hon'ble Mr. Lyon and he very kindly granted a patient hearing to me and asked me to submit a memorial to him stating all the facts. I sent the same some time in September 1913 but unfortunately forgot to put the date in it. I received reply from the Officiating Secretary, Government of Bengal, Revenue Department (*vide* his letter No. 3718-M. R., dated the 15th November 1913). On the 21st November 1913, I sent a reply to the same (*vide* my

letter of the 21st November 1913) and got reply to it on the 15th December 1913 from the Under-Secretary to the Government of Bengal, Revenue Department, asking me to see the Hon'ble Mr. Kerr about the supply of wood. The Hon'ble Dr. Sircar kindly accompanied me on the day when I had an interview with the Hon'ble Mr. Kerr. He gave me a patient hearing and asked me what minimum quantity would suffice and I mentioned 5,000 maunds in each year to which he agreed and suggested a rise in the price and I agreed to this also. He took down notes of these and both Dr. Sircar and I were impressed that 5,000 maunds of timber would be given to me yearly at 7 annas a maund and we came away satisfied. After that interview I arranged labourers and employed two or three most necessary men to cleanse the machineries and wrote to my manager to join from February next. On the 12th January 1914, I got a letter from the Hon'ble Mr. Kerr which fell upon me like a bolt from the blue and all my future hope of recouping myself was shattered. I dismissed the men and closed the factory for good. I could not make out the reason for this and do not know up till now why I was deprived of this privilege and through whom. If this had not taken place then I could have worked the factory successfully and made a decent profit for the worst brand Japanese matches are being sold at Re. 1 per gross now.

After the war broke out the Government of Bengal deputed Mr. Swan to visit and report on the existing factories in September 1914, and I quote the following from his report:—“Forest Department should make special arrangement for the supply of wood on favourable terms to such industries as match, pen and pencil making,” but up till now nothing has been done.

Then the famous debate in the Bengal Council took place at Dacca in July 1915, on the motion of Babu Surendra Nath Banerjea but he was silenced by the Hon'ble Mr. Beatson-Bell by stating many things such as the trees are scattered in the Darjeeling Forest—as if a forest must consist of one kind of trees only and closely packed—and further referred Babu Surendra Nath to read “Commercial Guide to the Forest Economic Products of India” and “A Monograph on the prospect of the Match Industry in the Indian Empire with particulars of proposed Match Factory sites and woods suitable for match manufacture.” It was just like Greek to an ordinary Bengali and Babu Surendra Nath and his honourable colleagues sat silent for every one of them was as innocent on the subject as babies unborn and the same thing must be said of the Honourable Member-in-charge of the Forest Department for he acted the part of a blind leading a blind, for he I am sure himself had not seen these books. Otherwise he would not have ventured to cite these rulings which will go against him. In the first book, namely, “Commercial Guide to the Forest Economic Products of India” there is no mention about the wood in question and about the match industry. I quote below from Part I, Volume I, from the Indian Forest Memoirs by Mr. R. S. Troup, F.C.H., Imperial Forest Economist, page 146, No. 228—“*Evodia Fraaxinifolia*: description of wood: small or moderate sized tree wood white soft. Chief uses: posts of huts and excellent for matches.” Indian Forest Memoir, Part I, Volume 2—“A Monograph on the prospect of the Match Industry in the Indian Empire with particulars of proposed Match Factory sites and woods suitable for match manufacture”—by the same author on page 48, No. 12:—“*Evodia Fraaxinifolia* is one of the woods available in Bengal for match making. At the bottom of the same page “proposed site for the Match Factories in Bengal” occurs Calcutta. On page 49 of the same book Mr. A. L. McIntire, Conservator of Forests, states:—That after a full consideration of many factors necessary for the successful maintenance of such factory Calcutta and its environs—Khulna and Port Canning—are the only localities in which for the present, at least, capitalists are likely to invest their money on match factories.” In page XXIV of the same book under particulars regarding the suitability of Indian woods for match manufacture appears:—

No.	Scientific name.	Vernacular name.	Where found.	Suitability for match.	REMARKS.
18	<i>Evodia Fraaxinifolia</i> .	Kanukpa, Nep; Kanu Lepcha.	Eastern Himalaya 4,000 to 7,000 ft. Khasia Hills.	*“Very suitable for peeling, sticks very good, also most suitable for boxes. An excellent wood for match manufacture. Can be peeled in fresh conditions.”	Sample from Kurseong Forest Division, Bengal. The sample floated in the green state.

* These were tested and reported by Mr. A. Roller of Berlin.

In the map annexed with the same book the places suitable for match factory is marked with green ink and against Calcutta there is a mark like it.

I am very much thankful to the Hon'ble Mr. Beatson-Bell for the kind advice which he had given me through Babu Surendra Nath in his Dacca speech and I have found out the mistake which I have committed in taking up a hopeless industry in Calcutta, but in that case I have erred with the Officers of the Imperial Government and this is my only and sole consolation and so I cherished in my breast a natural hope that when I erred with the Imperial Officers then they will try and help me out of this and will not make me—a poor man—lose so much money. With this hope in my breast I did approach the Government of Bengal.

As regards railway freight I saw the Manager, Darjeeling-Himalayan Railway, in Darjeeling and he asked me to send a formal letter and I did this and got the reply (*vide* letter No. D. K.-2207, dated 24th July 1913). The original freight was, I think, 7 annas 6 pies per maund from Darjeeling to Siliguri and it was lowered to 2 annas per maund. I applied to the Eastern Bengal State Railway on the subject but got the stereotyped reply that "Your letter No. of The matter is having attention and I hope to address you again on the subject." Since then no reply although several reminders were sent.

Extract from letter No. 1494—604, dated the 12th July 1911, from the Conservator of Forests, Bengal, to the Imperial Forest Economist, Dehra Dun.

* * * * *

Evodia Fraxinifolia is plentiful in the Darjeeling forests where it is considered useless even for firewood. Freight on the Darjeeling-Himalayan Railway is high but if the match factory think they can use the timber at a profit arrangements can be made to supply experimentally a small quantity of the wood if they state definitely what number of cubic feet are wanted and agree to bear the actual cost of collection and transport. Arrangements for a regular supply could be made later if the experiment is successful. I am informing the factory.

No. 1495—604, dated Darjeeling, the 12th July 1911.

Extract forwarded to the Manager of the Bande Mataram Match Factory, Calcutta, for information.

(Sd). C. E. MURIEL,
Conservator of Forests, Bengal.

No. 746-G., dated Darjeeling, the 23rd March 1912.

From—J. W. A. GRIFFIN, Esq., Deputy Conservator of Forests, Darjeeling Division,
To—The Managing Proprietor, Bande Mataram Match Factory, 38, Russa Road, South, Tollygunj Post Office, Calcutta.

In continuation of this office letter No. 707-G. of the 8th instant, I have the honour to inform you, in reply to your paragraph 2 of letter of 27th February 1912, that Pakhay Lall and Nandu Sirdars of Senchal Range, Jore Bungalow, Ghoom Post Office, have agreed to supply you with *Evodia Fraxinifolia* at an uniform rate of Re. 0-7-0 (annas seven) per maund delivered on the waggons at Ghoom station. For further communication please address them direct at the abovementioned address.

Dated Calcutta, the 30th November 1912.

From—Babu SAILENDRA NATH MITRA,
To—The Deputy Conservator of Forests, Darjeeling.

I beg to thank you for the two sample pieces supplied by you at the request of my representative. One of them marked "K" and called "Kapashi" will suit me exactly. I am writing to the contractor Nandu and Pakhay sirdar of Jore Bungalow, Ghoom, to take permission from you to fell these trees and send me 500 maunds of this wood by the end of January next. My representative told me that this wood can be had in plenty in the Government Reserve Forest.

Kindly let me know what quantity I can usually get each year of this wood and for how long? I will require about 18,000 maunds each year. I shall be obliged if you will grant me monopoly of this and *Evodia Fraxinifolia* wood for a period of twelve years so that these trees may not be used as fuel or for any other purpose.

No. 750-G., dated Darjeeling, the 4th December 1912.

From—The Deputy Conservator of Forests, Darjeeling Division,
To—The Managing Proprietor, Bande Mataram Match Factory, 38, Russa Road, South, Tollygunj Post Office, Calcutta.

In reply to your letter of the 30th ultimo, I have the honour to intimate that this Department cannot give monopoly and that you must buy from sirdars who will, as a rule, have plenty of these woods.

Dated Calcutta, the 8th March 1913.

From—Babu SAILENDRA NATH MITRA,
To—The Secretary, Revenue Department, Government of Bengal.

I beg to inform you that I, in conjunction with Dr. R. B. Ghose, have started a match factory which is being managed by me.

This being a new venture in Bengal I have had great difficulty in finding suitable timber for match making, but after carrying out many experiments and spending considerable sums

of money we have found that the following two woods "Khanakpa" or *Evodia fraxinifolia* and "Kapasi" which I think to be *Trema orientalis* are most suitable for the purpose.

These timbers I can get in limited quantities from the Darjeeling Division, but unless a better arrangement is made I cannot obtain a regular supply of the timber I require. I therefore most respectfully request you to order the Forest authorities concerned to make the following arrangements:—

- (i) To supply me with 15-20,000 maunds of two timbers annually, or to allow my contractor only to fell these species.
- (ii) If the logs are supplied by the Forest Department, to do so at cost price and only charge a nominal royalty or if I am allowed to extract them to be allowed to do so at 6 pies per cubic foot, as is the case with tea box woods.
- (iii) If the logs be supplied by the Forest Department, that they should be not less than 5 feet long, with a midgirth of 2 feet 6 inches with bark on.
- (iv) That an area be set aside for my use in which the two abovementioned species be reserved so that there may be a sustained supply for the future sufficient to yield at least 20,000 maunds annually.
- (v) That I be given a lease in the Darjeeling Division extending over 15 years, during which period I guarantee to utilize the annual supply put at my disposal.
- (vi) That the Forest Department be requested to select the forest in the Darjeeling District for which the lease is to be given.

No. 609—410, dated Darjeeling, the 25th April 1913.

From—C. E. MURIEL, Esq., Conservator of Forests, Bengal,

To—Babu SAILENDRA NATH MITRA, Bande Mataram Match Factory, 38, Russa Road, South, Tollygunj Post Office.

With reference to your application, dated 8th ultimo, addressed to the Secretary, Revenue Department of the Government of Bengal, and which has been sent to me for disposal, I have the honour to inform you that the trees *Evodia fraxinifolia* and *Trema orientalis* do not grow alone but are scattered over the forests.

Under the working plan for the Darjeeling Division trees of all kinds are marked for sale in groups and it is undesirable to have more than one purchaser working in any group. In the groups marked for felling in 1913-14 there are 129 Kapashi trees and 2 Khanakpa mixed up with a much larger number of trees of other species. These trees are all over 4½ feet girth and you require billets of 2' 6" in girth only, so that you would only utilize a small proportion of the trees if they were sold separately to you.

In these circumstances the most convenient and economical method for extraction is to sell the Kapashi and Khanakpa trees along with the other trees in each group and for you to purchase from the contractors, who buy the groups at auction, such portions of the Kapashi and Khanakpa trees as suit you.

2. The Forest Department cannot undertake extraction for trade purposes in the Darjeeling Division nor can a lease be granted to you for the extraction of 2 species of trees growing scattered in small numbers over the forest.

It is open to you to bid at the auction for any group of trees marked for felling.

Dated Calcutta, the _____ 191 .

From—Babu SAILENDRA NATH MITRA, Proprietor, Bande Mataram Match Factory,

To—The Hon'ble MR. P. C. LYON, C.S.I., Member, Executive Council to the Governor of Bengal.

I have the honour to bring to your kind notice that I am the managing proprietor of a match factory which I started in partnership with Dr. Rash Behari Ghose in 1907.

This being a new venture in Bengal I have had great difficulty in finding suitable kinds of timber for making match sticks and boxes. After carrying out many experiments and spending considerable sums of money I have found out that three kinds of timber, viz., Khanakpa (*Evodia fraxinifolia*) Kapashi (*Acer campbelli* and *Trema Orientalis*) and Arupate; all of which are available in the Darjeeling and Kurseong Forests are suitable for the purpose.

In order to secure these I submitted an application on the 8th March last to the Secretary, Revenue Department, and he forwarded the same to the Conservator of Forests, Darjeeling, for disposal on the 19th April.

The Conservator of Forests addressed me a letter on the 25th April last (copy enclosed) from which it appears that he was under the impression that I wanted pieces of timber of 2 feet 6 inches girth only whereas I had stated in my letter that this size should be the minimum. I had the honour to have an interview with the Conservator of Forests on the 5th July last in the course of which I explained to him all that I wanted. He drew my attention to the orders of the Government of India under which he could not supply the required timber

departmentally. I explained to him that it was not possible for me to rely upon the sirdars for a regular supply of timber for the following reasons :—

- (1) According to the conditions of auction sale they would have some allotted time for felling the trees which arrangement would make it impossible for them to supply me regularly with *green* timber throughout the year.
- (2) There might not be any of the abovementioned kinds of timber in the portion of forest sold to them in a particular year.

The Conservator of Forests kindly further read out to me a note from the Assistant Conservator of Forests, Kurseong, from which I found that a large quantity of the material could be had from the Kurseong Division. I next had a correspondence with the Assistant Conservator, Kurseong, of which I enclose copies herewith.

I humbly pray that the following arrangement may be made by the Forest Department :—

- (i) That steps may be taken for supplying me 20 and 30 thousand maunds of the three abovementioned timbers annually at the rate of 2 to 3 thousand maunds a month.
- (ii) That charges should be made only on the actual cost incurred by the Forest Department in felling, cutting the logs into the required size, carrying them to the station and loading them on the waggon, and that the royalty should be nominal.
- (iii) That the logs should be 5 feet long and with a minimum midgirth of 2 feet 6 inches and maximum 5 feet with the bark on, and these be despatched as soon after felling as possible.
- (iv) That not less than 150 maunds of timber should be loaded in each waggon.
- (v) That the abovementioned species of trees be preserved so that there may be a sustained supply for the future.
- (vi) That the Forest Department should select the forest in the Darjeeling and Kurseong Divisions for this purpose.

I beg leave to suggest that the abovementioned work of felling, gathering and conveying the timber may be effected by contract labour under supervision of the existing staff thus avoiding any permanent increase of establishment charges for additional staff.

It is my further prayer that if necessary the Government of Bengal would kindly represent to the Government of India the desirability of having the orders of the Supreme Government which prevents my having a regular supply of timber departmentally, relaxed in favour of the first industry of its kind on this side of India.

No. 3718-M. R., dated Calcutta, the 15th November 1913.

From—The Hon'ble Mr. H. F. SAMMAN, I.C.S., Officiating Secretary to the Government of Bengal,
To—Babu SAILENDRA NATH MITRA.

I am directed to refer to your undated letter addressed to the Honourable Member-in-charge, which was received on the 13th September 1913. You ask that arrangements may be made by the Forest Department for supplying you direct with three kinds of timber, viz., Kapashi, Khanakpa and Arupate for making match sticks and boxes in the Bande Mataram Match Factory of which you are the managing proprietor.

2. In reply, I am to say that, after giving your letter careful consideration, the Governor in Council regrets his inability to comply with your request. It is true that a consignment of 150 maunds of Khanakpa timber was supplied to the Bande Mataram Match Factory in September 1911 at a very low figure; but that timber was obtained in close proximity to the railway and only the bare cost of felling and transport was charged. As has already been explained to you by the Conservator of Forests, it would be impossible for the Forest Department to guarantee a regular supply at similar rates. Its existing staff would not suffice for the work, and the limitations you set upon the size of the logs to be supplied would result in heavy wastage, which would entail loss on the Department.

3. The most economical arrangement for all concerned is for the match factory to continue as at present to obtain the timber through the contractors who buy the trees in the groups and make use of the whole tree.

4. With reference to your request that the Kapashi and Khanakpa trees may be preserved for a sustained supply in the future, I am to state that the Forest Department does not desire to perpetuate species of such little value, but proposes to stock the forests of the Darjeeling Division with more valuable woods; there will, however, be a varying outturn of Khanakpa and Kapashi for many years to come, and the Conservator of Forests, Bengal, will be glad to keep you informed regularly of the number of trees that will be available each year and to keep you in touch with the purchasing contractors. Such information will usually be available some few months before felling as the markings in groups are done in advance.

Dated the 21st November 1913.

From—Babu SAILENDRA NATH MITRA,

To—The Secretary to the Government of Bengal, Revenue Department, Forest Branch.

I have the honour to acknowledge receipt of your letter No. 3718-M. R. of the 15th instant, and submit the following for your favourable consideration.

The Government appears to be disinclined to comply with my humble request chiefly on these grounds :—

- (1) As regards the rates I beg to point out that in my last letter I did not offer any particular rate high or low for the supply of timber though I incidentally prayed that the actual cost should be charged against me. If however the Government would kindly let me know the rates at which it would be possible for the Forest Department to grant a regular supply I shall be glad even to strain my resources in order to meet the wishes of the Government as far as possible.
- (2) As regards the question of labour necessary for the purpose I suggested in my last that the work of felling, gathering and collecting the timber might be effected by contract labour under the supervision of the existing staff and I have not the least objection to pay any necessary charges on this account. I hope however that no permanent addition to the existing staff would be necessary.
- (3) As regards the size of the logs it is true I entered into some details that would be convenient for my purposes; if however the Department finds any difficulty in observing the details I shall be quite satisfied with a supply of any size provided the minimum midgirth does not fall short of 2' 6."

I may be permitted to mention here that in spite of repeated efforts I have failed to get a regular supply of the requisite timber through the contractors and the prospect of the factory now entirely depends on the beneficence of the Government.

I am grateful for the offer of regular information regarding the trees in question but for reasons mentioned in my previous letter I am afraid that it will not be always possible for me to secure timber from the contractors.

Under the above circumstances I pray that the Government will kindly make arrangement for supplying me with the three kinds of timber, viz., *Khanakpa*, *Kapashi* and *Arupate* direct through the Forest Department.

As regards the Forest policy I do not venture to enter into any discussion with the Government. I am confident, however, that the existing stock of the abovementioned trees will be quite enough for my purposes for several years to come.

No. 4281-M. R., dated Calcutta, the 15th December 1913.

From—J. N. MITRA, Esq., Under Secretary to the Government of Bengal,

To—Babu SAILENDRA NATH MITRA, 94, Bakul Bagan Road, Bhowanipur.

With reference to your letter, dated the 22nd November 1913, regarding the supply of certain kinds of timber for the Bande Mataram Match Factory, I am directed to say that the Hon'ble Mr. Kerr, Revenue Secretary to Government, will be glad to see you in office any day this week between 10 A.M. and 1 P.M.

Dated Calcutta, the 12th January 1914.

From—The Hon'ble Mr. J. H. KERR, C.I.E., I.C.S., Secretary to the Government of Bengal,

To—Babu SAILENDRA NATH MITRA, 94, Bakul Bagan Road, Bhowanipur.

With reference to your letter, dated the 22nd November 1913, regarding the supply to you by the Forest Department of certain kinds of timber from the reserved forests in the Darjeeling and Kurseong Forest Divisions for the Bande Mataram Match Factory, I am directed to say that, after a further careful consideration of your application, the Governor in Council regrets that it is not possible to arrange for the departmental extraction of the timber required by you. But as already promised, Government will assist you, as far as possible, in your dealings with the contractors.

2. I am to add that it has been ascertained from the Conservator of Forests that 5,000 maunds or possibly more, is estimated as the probable outturn of *Khanakpa*, *Kapashi* and *Arupati* timber in 1914 and 10,000 maunds nearly all of which would be *Kapashi* in future years. It must, however, be clearly understood that Government is not in a position to guarantee any minimum outturn, and that while the officers of the Forest Department will be prepared to put you or your responsible agent in communication with the contractors, and to afford you all the information available, it will be necessary for you to make your own arrangements with the contractors as to price and supply.

The following is a note on the pencil factory of the Small Industries Development Company, Limited.

The company was started in 1907 with a subscribed capital of Rs. 83,590 at Rs. 10 each Pencil factory. for 8,359 shares, of which Rs. 52,050 only were realized. Some of the promoters who promised ten thousands of rupees even did not pay for the shares which they put against their name. The company struggled hard to raise the money by selling shares but failed so that they had to borrow money at a high interest.

At first there was difficulty in obtaining suitable wood. Numerous kinds of wood were tried but none seemed satisfactory; the only wood found suitable was *Cupressus Torulossa* (Himalayan Cypress). We secured this wood from Pandit Sunderlall Pathak, the forest officer of Patiala State, and subsequently through Mr. Pearson, Forest Economist, Dehra Dun, secured a few pieces which when worked seemed to suit our purpose. It was quoted in his book (The Commercial Guide of the Forest Economic Products in India—page 43) Rs. 45 per ton delivered in Calcutta. But when asked to supply the forest officer of Jansuar quoted Rs. 75 per ton. So the cost was prohibitive for our purpose.

After all, cedar wood was found in Baluchistan which was the only source we looked for our supply. But the attached correspondence will show how bitterly we were disappointed by the action of the Baluchistan Government.

The question of freight which is of prime importance unless redressed is absolutely prohibitive to a concern like ours. We wanted the freight to be calculated on the actual weight and not on the marked carrying capacity of the wagon in which it can be put in even filled up to the brim. In bringing cedar wood from Quetta to Kalighat the railway companies charged Rs. 460-6-0 for 220 maunds whereas it took us 30 shillings per ton to bring 6 tons of cedar wood from London to Calcutta.

Re Plastic clay. The Director of Geological Survey replied that it could be found in Lakhi and Kirthar group in Baluchistan and in Gondwana group in Bengal.

Local manufactured products ought to be purchased by the Government and the railways ought to give an impetus to the industries and give them an opportunity. During the last census in 1911, the Controller of Stationery kindly placed with us an order of two lakhs of pencils and gave us one month to manufacture them. We supplied the pencils in the allotted time and to the satisfaction of all concerned as will appear from the correspondence but since then not a single pencil was taken from us. We sent some pencils to Sir T. R. Wynne, the Chairman of the Railway Board, and he was satisfied with the pencils (*vide* his letter, dated 9th March 1911). We approached the E. I. Railway, the premier railway in India, and got the accompanying letter from the Controller of Stores but not a single pencil was taken from us up till now.

Extract from letter No. 370, from Extra Assistant Conservator of Forests, Quetta, dated 25th November 1912.

"Nevertheless for the year 1913-14, the Revenue Commissioner of Baluchistan is willing to allow the cutting of 1,000 maunds of the woods from the dying trees in the last resort provided that the first effort is to obtain the 5,000 maunds required for the pencil supply from dead wood."

Since then 3 consignments of cedar wood came but owing to the heavy freight and the quality of the wood from the dead trees which is chiefly used for fuel and have cracks and insect borings in the centre, it was discontinued.

Then application was made through the Department of Commerce and Industry, to the Government of India, for the supply of live cedar-trees and in reply, No. 8464—41, dated 9th June 1915, appears the following extract:—

"In view of the scanty reproduction and exceedingly slow growth of the Juniper the Government of India regret that they are unable to allow commercial exploitation of the live trees of the Juniper forest. They are asking the Agent in Baluchistan to do his best to secure for the Small Industries Company a reasonable supply of fairly sound dry timber."

Extract from letter No. 160-P, from the Revenue Commissioner of Baluchistan, dated 30th June 1915.

"With reference to paragraph 2 of the letter No. 8464—41, dated 14th June 1915, from the Government of India, Department of Commerce and Industry, to your address, I have the honour to say that the Honourable Agent has already granted a concession for the supply of 5,000 maunds dry Juniper timbers per annum for three years to Professor Godbole of Dayal Singh College, Lahore, and I am afraid it will not be possible to grant you any large quantity of Juniper timber for these three years. If you will let me know your requirements, efforts will be made to try and accommodate as far as possible."

No. 1295, dated 7th February 1911.

From the Controller of Stores, East Indian Railway.

In reply to your letter of the 4th instant, I have to inform you that we do not require the lead pencils at present, the samples submitted by you however appear suitable.

ORAL EVIDENCE, 5TH DECEMBER 1916.

Mr. A. Chatterton.—Q. You floated the Small Industries Development Company in 1908. What industries did you propose to take up?—A. We started with pencils and buttons at the beginning.

Q. What is the capital of this company?—A. The subscribed capital was Rs. 83,590 and we got only Rs. 52,050.

Q. What became of these factories?—A. The pencil is going on and the button we have closed.

Q. From what material did you make buttons?—A. From shells.

Q. Where was the factory?—A. In Calcutta.

Q. You say that there was over-development in the manufacture of soap and there was price cutting. Were these very small factories?—A. Very small.

Q. Making an inferior kind of soap?—A. There was superior soap also. At first they made the superior soap and then the quality began to deteriorate.

Q. You say that Government ought to take the lead in starting demonstration factories and that they should be handed over to private persons after the experimental stage is over. What do you consider should be the completion of the experimental stage?—A. When it is found that articles of good quality are manufactured and the arrangement for raw materials has been made.

Q. Would you consider it not necessary to carry the thing to a commercial success?—A. If they have made the right stuff and arrangements for securing the proper raw materials have been made.

Q. That does not prove that the articles can be manufactured commercially. Don't you want to prove that they can be made a commercial success?—A. It will prove a commercial success if the articles can be made here.

Q. After the materials have been tested and satisfactory products made from them, don't you want to run the industry for some time and train the Indian manager and the workmen?—A. I have said that all these managers and foremen should be taken into the demonstration factories to learn part of the work.

Q. With reference to the industrial bank you propose that the management should be one half nominees of Government and the other half elected by the shareholders. How do you propose that the money should be invested? Who is to advise?—A. The directors.

Q. Do you propose that the directors should be experts in industrial matters?—A. Not in industrial matters. They would advance money in a businesslike way.

Q. If there is an industrial bank started the directors will want expert advice as to the investment of the money?—A. They can see the balance sheet of the concern and act accordingly.

Q. Is that the only criterion? In some cases the more money that is advanced the greater will be the risk involved?—A. Not in that way. For instance, I have a pencil factory and I want some additional machinery and I want some money, in that way I mean.

Q. You suggest that there should be a technical institute for Bengal and that the Director should be a high class scientist who should be engaged for a certain number of years, for a fixed period. What do you mean by fixed period?—A. For a certain number of years, say 5 or 8 or 10 years.

Q. What is the object in limiting the time?—A. You may not get good men coming out if you do not fix the period.

Q. Then you suggest that the technical institutes should be intimately associated with the Director of Industries whom you propose should be created and the governing bodies of the technical institutes should be advisers to the Director. Is that your idea?—A. Yes.

Q. Was the Bande Mataram Match Factory one of your concerns?—A. That was started by myself and Dr. Rash Behary Ghose.

Q. What became of this match factory?—A. It is closed now.

Q. And the machinery?—A. It is lying there.

Q. Why was it closed down?—A. Simply because we could not get the wood. We could not get the wood from the Government forests as we expected.

Q. What made you locate this factory in Calcutta?—A. I was advised by the Forest Economist that Calcutta is the best place. I have referred to his publications.

Q. You made no other attempt to get wood from any other place except the Darjeeling hills?—A. Darjeeling is the nearest forest where suitable wood is available.

Q. Putting your factory in Calcutta you had to meet with a very severe competition with imported matches?—A. I had to face competition with Swedish, Austrian and German matches.

Still I used to sell them at a lower price. My price was 10 annas and theirs was 12 to 13 annas.

Q. Did you not get wood from the United Provinces or from the forests further North ?
—A. The railway rates would be prohibitive and especially for the match industry you want green wood, dry wood would not do.

Q. Have any applications been received for the sale of the machinery ?—A. I have not received any. Mr. Swan made the enquiry and he assured me that he would try to get the wood for me.

Q. No steps have been taken by Mr. Swan ?—A. Nothing of the kind.

Q. When you started this factory what class of boy did you get to do the work ?—
A. Boys of 8 and 10 years. I employed about 40.

Q. In regard to education was your factory working long enough to form any judgment as to the qualifications of the boys that you wanted in matters of general education ?—
A. Some of them did not know how to read and write.

Q. How long were you running this factory ?—A. From 1908 to 1913.

Q. Did you find that boys who received elementary education took to the work better than those who had no elementary education ?—A. Those who had no education took to the work more easily.

President.—Q. Whom do you find more efficient, boys who have had some education or those who have not had any education at all ?—A. The boys whom I employed in my factory had very little education.

Q. You were not able to get boys with some education ?—A. No.

Q. You do not mean to say that education is a disadvantage ?—A. Certainly not.

Q. Have you had any practical training in match making ?—A. No.

Q. You brought out a German to run the factory ?—A. Yes.

Q. Was he an expert match maker ?—A. Mr. Roller sent him out.

Q. You have no idea of whether this man was a first class technical man or only an ordinary workman ?—A. He did his work well and trained many of my boys.

Q. So your real trouble was the supply of suitable wood ?—A. Yes.

Hon'ble Pandit M. M. Malaviya.—Q. How many match factories are there working in India ?—A. There are two only. One at Ahmedabad and one at Bareilly.

Q. And one at Kotah ?—A. That did not work regularly.

Q. What is the total quantity of matches imported ?—A. That I cannot tell you.

Q. There is need for more match factories ?—A. Certainly.

Q. What is the amount of capital that you invested in your factory ?—A. One lakh of rupees.

Q. You say as regards freight that the Eastern Bengal Railway replied that the matter was receiving their attention and that they would address you shortly. Have you received any communication ?—A. That is the only letter which I got.

Q. So far as the machinery and the workmen were concerned you had no difficulty, your chief difficulty was suitable wood. You failed to get that in spite of your best endeavour. You have no complaint to make as regards the information contained in the Government publications about this being a suitable centre for a match factory. It is only with regard to the getting of wood that you found difficulties ?—A. Yes. The wood was the only thing that stood in the way.

Q. Did you not write to the Commerce and Industry Department ?—A. I did not.

Q. I wish you had done so ?—A. I should probably have got the same reply from them as well.

Q. I can assure you that you would have received a more helpful response from Mr. Low. As regards the pencil factory, you were not actually misled by the information given in the Commercial Guide. But the practice did not conform to the information given there. It was probably the fault of the particular officer concerned. You cannot say that the information misled you. It may be right ?—A. It may be.

Q. The pencil factory has been a success ?—A. Yes.

Mr. C. E. Low.—Q. When did you start your match factory ?—A. I began in 1908 but actually worked from 1909.

Q. Don't you think you would have been wiser if you had begun by going about and seeing as to the quantity of timber that is available ?—A. How can I do it.

Q. You speak about the getting of the classes of timber you require out of the forests through special contractors. The Forest Department sell a certain area. If they get anybody else working in the coupe the regular contractor will accuse him of stealing and the former would not give so high a price for the coupe. The regular contractor or the other hand if he gets all that grows in the area will try to make the largest possible profit he can out of any one who wants to purchase. Have you any suggestion for overcoming this difficulty ?—A. I think the coupes may be so arranged so that a certain number of trees may

be felled every year. Mr. Muriel pointed out that they were sold in blocks. In one year I shall get only a few trees of the kind I want. In other years I shall get more. I suggest that so many trees should be made available in every year.

Hon'ble Pandit M. M. Malaviya.—Q. If the Government help you to obtain the wood you require, are you ready to start the factory at once?—A. Yes.

Q. You do not think there will be any other difficulty?—A. Difficulties about paper will arise.

Q. That will be temporary?—A. I do not know whether it will be temporary or for good. All the papers I use to get from England. As regards chemicals, Messrs. Waldie and Company have promised to supply me if I will require them on a large scale.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. In reply to one of the members of the Commission you said that you could work this match factory with profit if you had the wood. What price are you prepared to pay?—A. I agree to pay 7 annas a maund.

Q. That is a concession?—A. Not a concession. The actual price was, I believe, four annas a maund. The two waggon loads, which the Forest Department supplied me, came to only 4 annas a maund including royalty, the felling charges and the cost of bringing the wood to the railway station.

Q. How much is the cost of the wood and how much the other material? Can you tell the percentage roughly?—A. For chemicals you want three annas. For wood 3 annas 6 pies and for paper labels and all that 9 pies. My cost of production was 9 annas per gross. I was selling at 10 annas.

Q. How much money have you put in?—A. A lakh of rupees.

Q. Have you got the men and the machines?—A. Yes.

Q. In the industrial bank suggested if instead of Government subscribing the capital, suppose the Government guarantees interest. Don't you think the public will subscribe?—A. At the present moment the Government ought to subscribe. Otherwise the public would not.

Q. If the Government guarantees 5 per cent?—A. Then money will come in. If Government guarantees 4 to 5 per cent, then money will be forthcoming in Bengal.

President.—Q. Referring to this correspondence that is printed with your evidence, do you object to our sending it to Government?—A. I have not the least objection.

Q. We will send it to the Government of Bengal and ask them if they have any explanation of the apparent failure to supply wood. Will you come and see me early in the new year after our return from the Central Provinces?—A. That will suit me very well.*

Sir D. J. Tata.—Q. With reference to those boys of 8 and 10 who work in the factory do you think that the town-bred boy who has received a little education is apt to be more disinclined to work than those who have no education and who come from the rural parts?—A. I think both of them work with their hands at the machinery.

Q. The moment a boy gets some education he is inclined to be lazy?—A. By little education I mean only reading and writing. That makes no difference. Our mistries are all getting Rs. 40 and Rs. 50. They all know to read and write. They do not complain of anything.

Q. My experience has been that town-bred boys are apt to be a little lazy, and they are not inclined to work as hard and such long hours as the others?—A. Of course it is so. But the boys whom I employ are all town-bred boys.

* NOTE.—The records of the Government of Bengal, which were kindly placed at the disposal of the Commission, showed that no guarantee of an annual supply of 5,000 maunds of timber suitable for matches had been given.

*Lt.-Col. Sir
Leonard Rogers.*

WITNESS No. 111.

LIEUTENANT-COLONEL SIR LEONARD ROGERS, I.M.S., *Professor of Pathology, Medical College, Calcutta.*

WRITTEN EVIDENCE.

I fear that I have no expert knowledge regarding the testing of drugs made in India. I am however interested in some questions regarding the cultivation of certain medicinal plants and the manufacture of important drugs from them, and submit the following views thereon.

Precis of evidence.—CINCHONA PLANTATIONS AND THE MANUFACTURE OF QUININE.—Government cinchona plantations and quinine factories exist in the Darjeeling hills and in Madras, and I have recently visited the former with Major Gage, I.M.S., the Superintendent. In a report on the prevalence of fevers in the Dinajpur District of Bengal in 1904, I drew attention to the utter inadequacy of the seven dispensaries and forty post offices among 1,500,000 inhabitants of that intensely malarious district to distribute enough quinine to have the slightest effect on the disease, and noted that the stock of quinine in the dispensaries was utterly inadequate, in one of them there having been only six drachms—barely sufficient to treat two cases of malaria—at the time of my visit and I suggested utilising the village school master to supply quinine to the children, who are by far the greatest sufferers from the

disease. I understand that as a result of that report the cinchona plantations were considerably extended in the Darjeeling hills and the outturn of quinine has been greatly increased by Major Gage, who has built up a considerable reserve. The sale of quinine in Bengal has considerably increased during the last few years under the Provincial Malaria Committee and the Sanitary Commissioner. The last report of Major Gage showed that the cinchona plantations have been a financial success, so their further extension appears to be advisable, as only the fringe of the great question of an adequate supply of quinine for treating the millions suffering from malaria in India has been touched, and the economic loss due to the weakening of the population in Bengal and other malarious parts of India is incalculable.

IPECACUANHA AND EMETINE.—It was only in 1902 that I pointed out that amœbic dysentery is the common form in Bengal, and that ipecacuanha, which had previously been used in all kinds of dysentery with very varying results, was a specific in the amœbic form, but useless in other forms. In 1907 I showed that tropical liver abscess can be prevented by the use of ipecacuanha in the early febrile stages, and which has led to the very great decrease in the prevalence of that disease. In 1914 I discovered that soluble salts of emetine were very much more effective than ipecacuanha by the mouth, which it has since almost entirely replaced. Owing largely to the war, the price of emetine has gone up very greatly, as Government required so much for Gallipoli and Egypt, but even before the war the Government of Bengal did not supply the drug in anything like sufficient quantity for many of their hospitals, including the Campbell hospital with several hundred dysentery patients a year with 40 per cent. mortality. During one year I supplied the drug through a grateful patient, and greatly reduced the mortality, but the rate has gone up again since my supply ceased. The diet of the patients during the extra time they are in hospital for want of emetine is doubtless much more costly than the drug, so this policy appears to me to be as unsound as it is inhumane. At my suggestion Major Gage has been cultivating ipecacuanha for some time, but two or three years will elapse before he can make emetine on a sufficient scale to supply even a small portion of the needs of India. The total alkaloids of ipecacuanha can be prepared at a small fraction of the cost of pure emetine hydrochloride, and my experience on protozoa and in cases of amœbic dysentery lead me to believe that it will be nearly as efficient, in which case the problem will be greatly simplified. India and other tropical and sub-tropical countries will not reap the full benefit from the discoveries leading to the great advances in our methods of treating amœbic dysentery and hepatitis until Government can supply the necessary drugs in ample amounts to all their hospitals and dispensaries and sell it at a cheap rate to medical practitioners.

OIL OF CHENOPodium.—This drug has recently been shown to be very effective and safe in hook-worm disease, so it may well replace the now very expensive and more depressant thymol and beta-naphthol. Major Gage at my suggestion has just commenced to grow it. The oil at present comes from America and is expensive.

The above are examples of drugs which are especially required in the treatment of widely prevalent tropical diseases of India, the preparation of which on a large scale by the Government of India would be of great advantage to the country. One reason why a large reserve of quinine should be kept in stock is for use during such epidemics of malaria as that which caused very great loss of life in the Punjab in 1908, much of which might have been prevented by a wider free distribution of quinine as a special measure, on the same principle as famine relief works; for such epidemics follow excessive rainfall and their epidemiology is sufficiently understood to allow the sanitary department foreseeing them in time to take measures to save many lives, which would be much more useful than publishing and discussing voluminous statistics based on absolutely unreliable data, such as most of the vital statistics of the civil population of India.

PHARMACOLOGICAL INVESTIGATIONS.—At the present time there is no professorship of pharmacology in India, and no material amount of investigation of drugs has been carried out in this country. One such post has been sanctioned for the Calcutta School of Tropical Medicine after the war is over. The fact that emetine was known for over eighty years before its therapeutic value in amœbic dysentery and hepatitis was discovered will suffice to show the importance and need of such work. There are many Indian indigenous drugs requiring scientific investigation, our knowledge of the chemistry of Chaulmoogra oil, the best known remedy for leprosy, for example, being still elementary, although it is now being investigated for me with the help of a grant from the Indian Medical Research Fund, while I have recently obtained a generous donation of half a lakh from the Maharaja of Darbhanga for work at indigenous drugs.

ORAL EVIDENCE, 6TH DECEMBER 1916.

President.—*Q.* I understand that a great deal of your activity has not immediately been concerned with our objects, but is concerned with the manufacture, on a large scale, of drugs that might be made sufficiently cheap and available to the people of India, in order that the other work that you have done may be turned into account. Apart from the investigation of the physiological and therapeutical action of drugs, and apart also from the distribution of knowledge concerning their uses, can you suggest a scheme for extending their manufacture in India?—*A.* They have the nucleus at Serail in the Darjeeling hills and can do a great deal more. They are growing ipecacuanha to make emetine, which is only

secondary in importance to quinine itself. I was there recently, and was told that emetine was made practically in the same way as quinine. They have got everything there for making a great deal. More of it might be done especially regarding those drugs which are required for tropical diseases. At the present time the price of emetine has gone up enormously, owing to the war, mainly due to Government having taken most of the supply for Egypt and Gallipoli. At the present time you cannot get emetine at any reasonable price. If it was manufactured and kept in stock at Serail, the matter might be remedied.

Q. Do you hope that we shall be able to manufacture the alkaloids of ipecacuanha, without regard to separating the emetine itself?—A. Yes, I have been testing this recently. They have extracted experimentally the total alkaloids, and can prepare that at a quarter of the price of pure emetine, and I find from my experiments that it is only very little less effective.

Q. Apart from the price, would there not be some delay in setting up appliances to manufacture pure emetine, and would we not obtain sufficiently good results if we manufactured the mixed alkaloids from ipecacuanha?—A. They can do both; they can manufacture the emetine; they have got everything there at the present time, but the difficulty is that the supply is insufficient for the needs of all the hospitals, at a reasonable price. I think they should manufacture pure emetine and also the alkaloids.

Q. You also mention chenopodium. Do you hope that will be manufactured?—A. Yes, Major Gage is taking that up and is growing it. It has really not been touched out here. At the present time investigations are being made by the Rockefeller Institution in America, and at Darjeeling and Ceylon. Chenopodium has been found superior to thymol and beta-naphthol.

Q. Does this hook-worm disease occur in mines in Bengal?—A. I am certain it does, because it occurs in the deep mines in California, where you get similar conditions. It has never been investigated at all. I shall get twenty thousand rupees a year from the Mining Association for research in the School of Tropical Medicine after the war which I intend to devote mainly to this work.

Q. Are there not many other drug-yielding plants now exported which could be used in the country?—A. Yes, the Director-General, Sir Pardey Lukis, sends an official witness to take up that point. Opium of course is being made, and the alkaloid from caffeine is very important. Thymol is now being made at Dehra Dun and wants extending. Belladonna and assafoetida, and also the sandalwood oil are all available in large quantities in India and could be manufactured here to great advantage.

Q. I suppose sandalwood oil is much cheaper now that it is being manufactured in India?—A. It ought to be.

Q. It is no use making these things in India if we do not make them available?—A. Yes.

Q. For the manufacture of most of these are not the appliances comparatively simple and the processes of a kind that could be designed by fairly good chemists?—A. Yes, I believe so. I have not much practical experience of it. That is what I understand.

Q. Do you think that any real harm is being done to the health of the people by the uncontrolled sale of patent medicines?—A. Yes, most certainly, as there are no arrangements for testing drugs. I have often heard physicians say that a lot of drugs are imported which are of no value, and no control is exercised over them. I find this a great handicap in medical work.

Q. Does that interfere with honest enterprise in making cheap drugs?—A. Yes, it would interfere with cheap drugs.

Q. In that case would you have these drugs manufactured by Government or by uncontrolled private enterprise?—A. If not manufactured by Government, they should be tested by some Government official to see that they are up to standard.

Q. If they are not manufactured by Government, in what way would they become available to people except at prohibitive prices?—A. They would have to compete with manufacturers at home, and unless they manufacture at reasonable prices, I don't think they would get a sale.

Q. In that case there would be a temptation to adulteration?—A. Yes; as a matter of fact Major Gage told me that he got quinine from Germany because it was cheap. In purity it was not as good as Government of India quinine.

Q. Some of these drugs are scattered through dispensaries. Are these dispensaries free to the public?—A. Yes, all the district dispensaries are free, and many people go there who can afford to pay.

Q. Do you think that either Government ought to pay the manufacturer and seller, or purchaser and seller of drugs that are relied on as cures for special complaints?—A. Yes, that would be a good plan.

Q. Have you heard of any difficulties connected with the application of anything like a Drugs or Food Act to prevent adulteration? You know what difficulties stand in the way of the administration of such an Act?—A. I think it would be very difficult in this country, but it is certainly badly wanted.

Q. I want to know whether, in view of the difficulties in administering such an Act, if, instead, it would be practicable and advisable for Government to undertake the manufacture of

these drugs, or, which is the same thing, to undertake the purchase and distribution of these drugs. From the point of view of the public health, it is important that this question should be met either one way or the other, by a definite Act recognising the sale of these drugs, or some administrative measure of the kind suggested?—A. I think it would be a great advantage. Medicine has often done a great deal of harm by the drugs not being efficient, and has consequently been brought into disrepute.

Q. And there are many lives lost through drugs of the right quality not being available?—A. Yes. In one of the biggest hospitals in India they found that the quinine was not acting efficiently, and when it was analysed, it was discovered that the dispenser had only put in half the proper quantity.

Witness here added—

Chaulmoogra oil is rather important, because an attempt was made to corner it by a railway doctor recently, in which case Government would have had to pay through the nose for their own products. That corner has been broken now.

Mr. C. E. Low.—Q. You have seen instances in which there was considerable diminution of efficiency in labour employed by large industries, owing to the presence or outbreak of various forms of disease. You are no doubt aware of the recent epidemic of fever in coal industries which occur in epidemic areas?—A. Yes, and also in the Punjab in 1908. I refer to it in my note.

Q. I was confining the question to persons employed in organised industries. Is it possible to forecast the occurrence of an outbreak of malaria in epidemic areas?—A. Yes, certainly it is by meteorological data. The Sanitary Department spend a great deal of time in investigating that. In various parts of India they work out charts showing definitely in each district conditions which lead to epidemics, it is very different in different parts of the country.

Q. I suppose that a free and well distributed supply of quinine would not of course be a fundamental remedy, but would meet the occurrence of such epidemics which threatened to endanger the output of industries of the importance which coal possesses at present?—A. Undoubtedly it is far the most effective method of dealing with the difficulty.

Q. Can you give us any idea of the scale on which it should be taken, for instance, in an area occupied by the coal industry?—A. Of course the ideal method is if you can give it to the men as a prophylactic. That would require 5 grains per day for each worker. That would almost entirely prevent an epidemic.

Q. You would apply it at a period during which you anticipated the outbreak of the disease?—A. Yes, and you would certainly save nine-tenths of your labour, and it would pay you over and over again. I think Government should have regular systems of distribution of the drug, on the same principle as famine relief works.

Q. Has this matter been brought before the Mining Association; have they undertaken to purchase the quinine and distribute it?—A. I hope this epidemic will lead them to do so. There are several lakhs worth of quinine in Serail. The Home Government wanted to take the whole lot, but it could not be given up. They sent a large quantity to Mesopotamia. There is a scheme under consideration for an enormously increased outturn.

Q. Supposing the Indian Mining Association decided now to carry out a big prophylactic campaign, under existing conditions, would the quinine be available?—A. At the present time there is a large amount available, and there will be an increasing amount every year.

Q. Have you had any experience of the conditions under which medicinal plants grown in Government Forests and yielding drugs, are procurable by would-be manufacturers?—A. There is the *Taraktogenos Kurzii*, yielding chaulmoogra oil, which grows wild in Assam and Burma, and which is let out by Government to anyone who would take the output.

Q. You understand that a manufacturing capitalist in Calcutta or Rangoon might find it extremely difficult to arrange for the physical exploitation and collection of such plants?—A. The Forest Department collect it.

Q. Departmentally?—A. I don't know. They let out each forest. Smith, Stanistreet and Company, for instance, are doing a great deal in that. They are the biggest manufacturers.

Q. You have no views which you would like to express on the general question of assistance which the Forest Department should give in collecting plants?—A. I am not in a position to speak of that.

Q. With reference to plants which may not be found wild in sufficiently concentrated amounts to be available for exploitation, you have to grow them; that is being done at present, I suppose by the Botanical Survey?—A. Yes.

Q. Has the assistance of the Agricultural Department ever been solicited for that purpose?—A. Not that I know of. The botanists here have all the knowledge they want without that.

Q. The Agricultural Department has considerable experience in organising labour, etc.?—A. They might be utilised in that way.

Q. Hon'ble Sir R. N. Mookerjee.—Instead of allowing Government to make the drugs and restrict private enterprise, for the purpose of assuring the purity of these things, don't you

think that it would do equally well if an Act was passed to the effect that every medicine and drug exposed to public sale should be certified by Government?—A. That would be very difficult. At the present time Government have factories working on the manufacture of quinine, and have all their preparations for making emetine, and to take all this away and give it to private enterprises would be a difficult thing. The difficulty is that the price varies at different times. A few years ago quinine was exceedingly cheap. Government laid in enormous stocks and now they are reaping the benefit. Where you have drugs like quinine and emetine, which is required in large quantities, Government manufacture would regulate the price.

Q. The Government move so slowly; take, for instance, the case of emetine?—A. They started emetine in 1912. There was no loss of time after the discovery by me. I think Government should undertake all those important drugs for which there is an enormous demand and upon which the health of so many lives depend.

Q. You said that some German quinine came here. Is there no check on such importations?—A. No, there is no check on imported drugs. That is one of the things required.

Q. Every foreign drug should be certified before being sold?—A. Yes. It has frequently been stated in my presence that a very large proportion of drugs imported into India was absolute refuse, and that no check was put on it.

Q. More strict check is wanted now for those imported goods than those manufactured here?—A. Government are only manufacturing quinine. I am talking about the whole of the drugs.

Mr. A. Chatterton.—Q. In reference to the list of drugs, is there any risk of deterioration if these are manufactured in large quantities and stored?—A. Not if you get the pure alkaloids. They will keep indefinitely under proper conditions.

Hon'ble Pandit M. M. Malaviya.—Q. Is the number of qualified practitioners in this country anything like sufficient to meet the needs of the people?—A. There is room for plenty more, but the people are so poor that they cannot afford to pay a proper qualified man.

Q. In order to have medicines tested before they are allowed to be sold, a big establishment would be necessary?—A. A lot could be done in the chemical laboratory of the Medical College. They do a lot of analyses for the Customs Department.

Q. Your remarks about tests apply only to foreign importations?—A. If there are any firms manufacturing drugs in India, their products should also be tested as well.

Q. What establishment do you think you would require for the purpose even in principal places like Calcutta, Madras and Bombay?—A. I could not give you any definite information.

Q. It would be very large?—A. No, not so very considerable. The chemical laboratory did the whole of the Customs work, Calcutta, for many years.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. About thymol, would there be a large consumption in the country, if produced?—A. Yes, there ought to be, only we have got two other drugs as efficient for the same disease.

Q. At present I hear that thymol is being exported instead of being used in the country?—A. It is being used in this country too.

President.—Q. Even if a drug could be imported of good quality, it could be adulterated after importation. With reference to this question of establishment required to undertake testing, would not a smaller establishment be required for that purpose if Government were wholesale manufacturers. Then the drug could be examined and passed in large quantities instead of selling it, say, in bottles?—A. Yes, that would be so.

Q. So far as it goes, that would be an argument in favour of Government being wholesale dealers?—A. Yes, especially in the case of drugs of especial importance in India.

Q. That would not get over the difficulty of adulteration after it has passed into the hands of the retail dealer?—A. You cannot get over that.

Q. You would still have to undertake legislation in order to penalize any adulteration of drugs?—A. Yes, that should be done.

WITNESS No. 112.

W. H.
rett.

MR. W. H. EVERETT, *Officiating Superintendent of Industries, and Inspector of Technical and Industrial Institutions, Bengal.*

WRITTEN EVIDENCE.

Q. 15.—(*Witness gave confidential evidence.*)

monstration
ories.

Qs. 19 & 20.—I am inclined to favour the establishment in Calcutta, of a permanent exhibition of machinery and processes, in which power, supervision and labour would be provided for the working of the machines and processes at certain times for purposes of demonstration. Some of the exhibits might illustrate improved machinery for dealing with

existing industries, while importers, manufacturers and others would be given every facility for the exhibition of new industries or processes. If a technological institute is to be created, the exhibition might be attached to it. Similar working exhibitions are successfully established in some towns in Europe.

Q. 22.—So far as possible, researches relating to Indian questions should be conducted Research abroad. in India. But cases may arise in which help from England would be desirable, *e.g.*, on account of men in that country having special knowledge or experience of allied questions, or on account of special apparatus or appliances not readily obtainable in India, or where important and elaborate investigations are already being made in England into questions at issue and these investigations can easily be extended to cover Indian conditions.

Q. 24.—I have not yet seen particulars of the Advisory Council for Research. In Commercial India a body for similar purposes would be useful. The Council here might comprise the heads of scientific departments (Geological, Botanical, etc.), officers deputed by the heads of the Forest Department and Public Works Department (preferably men who have made their mark by special investigations at the Forest Research Institute or elsewhere), and a few others, including educational officers, who have carried out experiments or tests bearing on industrial subjects. They might have a formal list of "correspondents," giving particulars of the subjects or parts of subjects of which each has special knowledge, the list being arranged under subject headings and also under provinces. Any question that is sent to the Advisory Council could then be readily referred to selected authorities for opinion and perhaps eventually for further investigation by one or more of the correspondents. Or, alternatively, these correspondents might be styled Members of the Advisory Council, and the heads of scientific departments, etc., might form the committee, and be chairmen of the various sections. Probably most of the work could be done by correspondence, or by meetings of a few selected members residing in the same district or province, so that unnecessary travelling might be avoided.

Q. 28.—I consider that the Calcutta commercial museum is a useful institution, though owing to its naturally not being exhaustive, I have, in one or two cases, not been able to obtain there information that I required for answering enquiries, and I have had to make enquiries independently. As opportunity offers I do what I can to procure additional exhibits and information for the museum.

Q. 45.—In the mechanical engineering industry the workshop is the best place for train- Training of ing the operative. But in Calcutta the supply of skilled artisans is far short of the demand, labour and and firms are unwilling to train raw hands, who may leave them for another firm as soon as supervision. their services begin to be of value. This appears to be a case where Government might well help the industry by giving lads a comparatively short course of training in handieraft in a special workshop. The course should be based on the requirements of local firms,—to be ascertained by consultation with these firms. Such classes could not, of course, bring in any considerable financial return by sale of work, and the effectiveness of the training should alone be considered. It has recently been found in England that sufficient initial training for raw hands, to enable them to operate the simpler machine tools in munition works, can be given in a very few weeks; and probably six months or less would be long enough for the Indian courses here suggested. The cost, initial and recurring, of such classes would obviously be considerable; but there appears to be an immediate and extensive demand for lads with some such training; and the engineering industry is fundamental to many other industries.

Q. 49.—I have been on the committee of the Calcutta technical night school since 1912 Industrial and and have seen the classes at work from time to time. This school is financed by some of the chief local engineering firms and the East Indian Railway, and receives an annual Government grant of Rs. 2,000. There is an attendance of about 60, consisting almost entirely of apprentices, European and Indian, employed in works, railways, the mint, etc. The classes are now held in rooms at the free school after school hours. The teaching could, of course, be greatly improved if there were a technical institute in Calcutta, whose staff, rooms, equipment, etc., could be utilised. But I consider that useful work is being done, even under present conditions, especially in machine drawing. The inferior educational qualifications of most of the lads, specially in mathematics, hamper the teaching in some subjects and retard progress.

Q. 50.—Industrial schools should, I think, be under the Education Department, just as mining education in Bengal is under the Education Department though guided by the Mining Educational Advisory Board on which the mining department is strongly represented. This system works smoothly and efficiently. Another example is the training of civil overseers in Bengal, which is supervised by the Joint Technical Examination Board but is worked by the Education Department. If industrial schools are to be under the Department of Industries, Sibpur College and Dacca School of Engineering would be partly under this department and partly under the Department of Education. Again, would full-time mechanical overseer classes be under the Education Department and similar but part-time classes for apprentices be under the Industries Department?

Q. 56.—(*Witness gave confidential evidence.*)

Q. 77.—The encouragement offered to educational officers of Government in this direction Study of foreign under general orders is suitable, except that I think higher pay than two-thirds might be methods. offered.

Q. 80.—The facilities offered hitherto at the Calcutta Government Commercial Institute are most inadequate. This has long been recognised by the Board of that Institute, who addressed Government some three years ago on the subject. The question was then postponed by Government, but, on a recent representation from the Board, the appointment of a highly qualified European Principal has been recommended by the Bengal Government to the Government of India. As soon as this appointment is made it is intended greatly to improve and develop commercial education in this province.

Hydro-electric
power surveys.

Q. 102.—So far as I know, the only enquiries made have been in connection with the minor local schemes, *e.g.*, for the electric supply of Darjeeling, Kurseong, etc. I think that a comprehensive survey should be made to ascertain the possibilities in Bengal and, if possible, in adjacent native states, *e.g.*, Sikkim, Bhutan, those adjoining Assam, and those of Orissa.

Railway freights.

Q. 97 and 103.—In a case regarding the selection of a suitable timber for jute-mill bobbins, I was informed by the manufacturing firm concerned that the Forest Department had given them every possible help in their investigations and that all they needed was favourable rates for freight, as to which they were enquiring from the Railway Board.

ORAL EVIDENCE, 6TH DECEMBER 1916.

President.—Q. You say that “you have not yet seen particulars of the Advisory Council for Research. In India a body for similar purposes would be useful. The Council here might comprise the heads of scientific departments (Geological, Botanical, etc.), officers deputed by the heads of the Forest Department and Public Works Department (preferably men who have made their mark by special investigations at the Forest Research Institute or elsewhere), and a few others, including educational officers, who have carried out experiments or tests bearing on industrial subjects.” If your Council comprises such a large number of interests, it would, of course, become very large. This question has been considered at home, and they have decided that it is better to have a small Council, and under that Council a large number of specialised sub-committees dealing, either with special subjects, or natural groups of subjects. That would prevent the Council becoming a sort of Parliament, and it will then practically limit its operations to a careful selection of the members of sub-committees and to adjudicating between relative claims when there is only a limited amount of money to meet proposals for research. This question at home has supporters for both sides. Would you prefer in this country a small Advisory Council for Research, together with a large number of small sub-committees dealing with specialised subjects?—A. I think on the whole that would probably be the best machinery. In my note I have suggested a somewhat similar scheme as an alternative to the other.

Q. Of course when you begin to recognise all the subjects that are necessary, they are just as numerous here as they are at home, and to get them properly recognised, it would have to be a great body. If you had all the interests represented, it might result in many not being satisfactorily handled?—A. I quite agree.

Mr. C. E. Low.—Q. With regard to the proposed technical institute in Calcutta, and the industrial institute at Dacca, I think I am right in saying that it was proposed that they should undertake what I might call industrial research to some extent?—A. Yes, that is, combine research and teaching.

Q. They would work under the Education Department?—A. That was our suggestion.

Q. Do you think the Educational Department a suitable organisation for superintending industrial research?—A. At that time no separate industrial department was contemplated.

Q. Supposing there were a separate Industrial Department?—A. I think probably then it might be desirable that the two should co-operate. Of course there are difficulties.

President.—Q. That is not an answer to the question. Which should it be, one or the other?—A. I have not considered the question * really from that point of view. It strikes me that, even if there is to be an Industrial Department, it would be better to have the institute under the Education Department.

Mr. C. E. Low.—Q. As you say yourself, it is very difficult to have part of a certain institute under one department, and another under another department. Don't you think that makes the present conception of the institute somewhat difficult to carry into effect? If you have research carried on in a technological institute which is to be under the Director of Industries and the rest of the work is under the Education Department. Don't you think it would call for some alteration in the scheme?—A. Certainly if the scheme is to be brought under the Director of Industries. At that time it was not contemplated to have separate departments.

Q. The present industrial schools in Bengal are somewhat numerous, aren't they? Their inspection is a fairly heavy job?—A. Yes.

Q. Would you give us an idea how many there are?—A. Somewhere about 50 big and small.

Q. What happens to the boys taught in these industrial schools?—A. We have had reports prepared in the case of a number of schools, and a good many become mistries afterwards. In some schools a considerable proportion become mistries and in others many of them

* See also additional written evidence printed after oral evidence.

get other jobs. Many leave before the course is finished, not having been properly trained, and drop their practical work.

Q. Is there any organisation for placing these fellows in jobs where the improved methods would be of assistance to them?—A. It is left mostly to the Superintendent of the school. He does what he can.

Q. Is the organisation reaching beyond the school itself?—A. No, but in some cases I have drawn attention to facilities for placing boys in railway workshops.

Q. But there is no organised connection between these schools and the various industries that may employ them?—A. No.

Q. What are they teaching in these schools; are they teaching indigenous methods or improved methods?—A. There are so many schools that it is hard to speak generally. Some of them are mission schools, some Government, some District Board schools. The general idea is this; for example, taking the carpenters' and smithy classes, we get the best mistries we can as instructors. We give them an extra training at Sibpur workshops, if possible, and do the best we can for them. Another point about the school is, we try to give the boys a little training in mechanical drawing, and very simple workshop accounts.

Q. Are you training for organised industries, or for village industries?—A. Mainly for village industries. Some of the lads do join railway workshops afterwards; the majority set up on their own account or under local employers.

Q. Are the schools primarily designed to give villages a better class of carpenters or blacksmiths?—A. Yes.

Q. Are the tools which they are taught to use such as they can buy afterwards, and are they suitable for use on village work?—A. Yes, as much as possible we try to encourage methods and tools which they can use and which are not beyond their means to purchase. They are taught to work both at the bench and sitting on the ground, and in the same way they are taught to use ordinary lathes and also the primitive lathes which village mistries use.

Q. For instance, take the common use of the saw, which is used one way by an English workman and the mistry here who has been trained, and entirely differently by the village carpenter. Which way do you teach them to saw?—A. In the English way.

Q. With of course an English saw?—A. Yes.

Q. Have you any knowledge how far they keep that up when they go back to their villages?—A. I cannot say.

President.—Q. Do the carpenters take with them a box of improved tools when they leave the schools?—A. They are encouraged to purchase them, and in some cases tools are purchased for them with the aid of bonuses earned by their work on outside orders executed at the school. At Faridpore school there is a skilled European *padre* who encourages them to get a set of improved tools.

Mr. C. E. Low.—Q. Is there a fund for assisting them to purchase improved tools?—A. In Government schools there is a system by which a portion of their earnings is kept by the school.

Q. Deferred pay?—A. That is practically what it amounts to. In the artisan classes at Sibpur, where that system is in force, some of the lads leave with as much as Rs. 200 after four or five years.

Q. Do the schools make things for customers?—A. Yes, nearly all the schools do. They have a kind of sales department.

Q. Is any portion of the sales proceeds credited to the workers?—A. Yes, the idea is that they should be credited with a share of the value of their labour.

Q. What proportion of these pupils are in receipt of scholarships or some form of financial assistance?—A. Probably more than one-half of them on the average; in some cases two-thirds.

Q. Apart from carpenters and blacksmiths, you also have weaving schools, especially the well-known institution at Serampore. What is the connection between the "missionary" effort at Serampore in respect to the introduction of the hand-loom, and the Department of Co-operative Societies in Bengal?—A. Some attempts are being made at co-operation between the two, but not with very much success. The Registrar of Co-operative Societies has in some cases asked for Mr. Hoogewerf's help and *vice versa*, and some of Mr. Hoogewerf's passed pupils have wanted to be helped and he has invited the assistance of the Registrar, but the results have not been very promising.

Q. You train in Serampore mostly educated men of the student type?—A. Roughly about half and half, rather more of the mistry type. In connection with your question about co-operative societies, we have recently had sanction from Government for a system of advances to help passed pupils to purchase improved looms, etc.

Q. As you know, there is a large area round Serampore where the use of the fly-shuttle loom is well known. Is it chiefly those men that come, or weavers from outside?—A. Many come from Serampore and many from other districts, independently of whether they have learned the fly-shuttle loom or not, in order to learn the weaving of various patterns.

Q. Is there any out-door demonstration staff attached to the Serampore weaving school, employed in the rest of Bengal in tracts in which they are attempting to introduce the use of

these looms?—A. No, there are no peripatetic members of the staff, apart from the outlying schools. There are about half a dozen outlying schools in different centres, which have a certain amount of local effect. There are travelling weaving demonstrators under the Director of Agriculture.

Q. Do you know what the Co-operative Credit Department is doing in the way of industrial societies, especially with reference to weavers?—A. Apparently it is not able adequately to meet the requirements of weavers. In consequence of that, Government appointed a small Committee, including the Registrar of Co-operative Societies, to consider the matter. The outcome was that we decided that a system of advances was best.

Q. Referring to this question of the Calcutta night school, I understand the pupils are mostly from local engineering firms and railways?—A. Yes, practically, entirely.

Q. Are any of those boys Indians?—A. Yes, a fair proportion, about one-quarter.

Q. Where do the Indians come from; are they not exclusively from railways and not from engineering firms? A. No, Burn & Co. employ a number of Indian apprentices, but at Lilloah there are a number also. The numbers are, for Burn & Co., 8 Indians attending the school out of 22 of their apprentices attending.

Q. Will you state for the information of the Commission what exactly is this Calcutta Government Commercial Institute?—A. It started with the commercial department attached to the Presidency College; then it was separated and at present occupies a rented flat near the centre of the town. It recruits from about the matriculation grade, and trains students for about two years in commercial English, arithmetic, commercial geography, book-keeping, shorthand and typewriting. There are also separate evening classes in various commercial subjects.

Q. What happens to the pupils?—A. They all get fair employment.

Q. Everybody gets employment in Bengal who has had a literary education, but are they more valuable in commercial offices than the man who has not had that training?—A. Their value is enhanced by the training they have got there.

Q. You say you consider the existing facilities at the Commercial Institute are inadequate, and you would like to have something better. In what direction would you like to have it improved?—A. Certain of the staff cannot be described as particularly strong, and none are highly paid; the Institute is only in temporary quarters, and not enough money is spent on it. A highly qualified English Principal has been asked for, but cannot be obtained at present.

Q. What are the numbers, roughly speaking, of the students?—A. About 50 in the day classes and 100 in the evening classes. Only about 6 to 10 yearly pass the final examination of the full day course.

Hon'ble Pandit M. M. Malaviya.—Q. You say that the workshop is the best place for training apprentices, but for giving people a little higher education you certainly require a school of mechanical engineering rather than a workshop. Don't you?—A. You mean in training a man of the class of foreman? Yes, certainly, but workshop training also is necessary. There is a course in mechanical and electrical engineering at Sibpur for the higher grade.

Q. Even for the mistry class, you cannot rely upon the workshops to give you a sufficient supply of trained artisans, can you? Therefore you will have to go to the industrial school to which the workshop would be attached, to give them the necessary training?—A. In the case of mistries I should limit the additional training very much.

Q. But would you not like to have a school where they could go through a regular course to prepare them for the practice of their craft?—A. As regards the mere mistry, if there were a sufficient supply the matter would be all right, but the supply is short, and for that reason I suggested a comparatively short course of training.

Q. You say that "firms are unwilling to train raw hands," so until you have a number of schools where young men could go to learn a trade, to receive the necessary education, you could not meet the demand?—A. Yes.

Q. What was the kind of work which the technical institute which Dr. Denning supported was intended to do? What was the standard you aimed at? Was it to produce men who could take up the duties of managers of concerns on the technical side?—A. It was for both. We had both in mind. There were various proposals; some were for a higher standard, and some for an intermediate standard.

Q. Both foremen and managers?—A. Yes; e.g., in the case of the printing department, we wanted to train both pressmen and men of the engineer type.

Q. From your remarks about the report not having been acted upon, it seems to me that you think that the report should have been acted upon before the appointment of a Director of Industries?—A. I have not expressed any opinion on that point. I was only stating the fact.

Q. How many of these technical and industrial schools are there in the province?—A. Roughly 50 of one kind and another, almost entirely industrial, and only about half a dozen technical schools.

Q. What are these technical schools teaching?—A. The technical schools are mainly teaching for the examinations of the Joint Technical Board for Civil Sub-Overseers.

Q. All the technical schools?—A. Yes. It is a two-year course.

Q. After these boys have passed your examinations, they join Sibpur in the sub-overseer's standard?—*A.* Some of them go on, others leave.

Q. What is the salary these sub-overseers get?—*A.* About Rs30.

Q. In the industrial schools what are the subjects you take up; is it the same course in all these schools, or do you deal with different subjects in different schools?—*A.* Various subjects. The two subjects commonly taken are carpentry and smithy. There is a small number of weaving schools, etc.

Q. What is the staff of these industrial schools?—*A.* They vary very much. The Bogra Industrial School has a staff consisting of a superintendent, assistant superintendent, a teacher-clerk, and 4 mistries—2 for carpentry, 1 for blacksmithy and 1 for tinsmithy.

Q. What is the number of students roughly?—*A.* About 60.

Q. Is the superintendent an European?—*A.* No, he is a passed student of Sibpur. Unfortunately when these men were appointed, which was before my time, there was no supply of very suitable men to be had, as the students of Sibpur were trained mainly from the point of view of civil engineering work. Now Sibpur is turning out mechanical and electrical overseers.

Q. Are those trained on the mechanical side suitable as teachers in these industrial schools?—*A.* Probably the most suitable class of men that you can get at present. I should say, however, that they ought not to go straight to these schools before having some practical work in the shops.

Q. You think that the theoretical education at Sibpur should be supplemented by more practical work?—*A.* It is professedly incomplete. Of course it does not profess to turn out mechanical engineers without further experience.

Q. Except for this Calcutta Government Commercial Institute, is there any other provision for commercial education in Calcutta?—*A.* There is some for girls, at the Young Women's Christian Association. There have been one or two ladies attending the Government Commercial Institute, but there are none there now. I am not sure about the Young Men's Christian Association. I think they probably have some commercial classes. In addition to that, there are a few private schools of typewriting and shorthand. Two large Anglo-Indian schools for boys and one school for girls have recently sought and obtained affiliation to the Government Commercial Institute, so that they may send in for its examinations their pupils who are taking commercial subjects at schools.

Q. About these industrial schools, the research institute and industrial school being placed under the Director of Public Instruction, don't you think that so far as the technological institutes will do research work, they should be placed under the Department of Public Instruction? The University also will be expected to do some research work?—*A.* Yes.

Q. The University will do some research work, and the technological institutes will do some research work; don't you think that they would be more properly under the Director of Public Instruction and that the business side might be placed under the Director of Industries?—The difference is this. At the technological institute the object of the research will be purely utilitarian, whereas in the other case the point of view is that of pure science.

Q. So far as the technological research institute is concerned, when it has arrived at results, these results might be communicated to the Director of Industries, but so far as the theory of the investigation is concerned, should not all the staff be under the Director of Public Instruction?—*A.* It is a very debatable point. I have instanced one or two cases; for example mining education is successfully worked under the Education Department at present and I don't think that any objection has been raised by the mining authorities to the way it has been worked. They are given an effective voice in control.

Hon'ble Sir F. H. Stewart.—*Q.* You are an officer of the Indian Education Department?—*A.* Yes.

Q. Are you also a qualified engineer?—*A.* Yes. I was for two years employed in electrical works at home.

Q. What was your professorship in Sibpur?—*A.* Mechanical and electrical engineering.

Q. How long did you hold that?—*A.* About eight years.

Q. With regard to the projected appointment of Director of Industries in Bengal, do I gather from your answer that he is to be under the Revenue Department, that he would not have any executive powers at all, and would be simply advisory?—*A.* I know very little about the proposal. It has not come through me.

Q. The Registrar of Co-operative Societies comes under the Revenue Department?—*A.* I believe so.

Q. Do you think from your knowledge of Bengal and Calcutta that it will be a good thing to associate an Advisory Board with the Director of Industries when he is appointed?—*A.* I should say yes, as long as the Advisory Board does not hamper him in the matter of initiative.

Q. Do you think you would get suitable business men to serve on it?—*A.* I think so.

Sir D. J. Tata.—*Q.* With reference to what you say about hydro-electric power surveys, if such power were generated, what openings are there for the application of such power? To what purposes could it be applied?—*A.* I have not thought that out definitely.

Q. If you had, say, hydro-electric power in Sikkim and Bhutan, to what purpose would you apply it?—A. Of course there are some industries that can be put almost anywhere, and some that cannot.

Q. What is the good of power where it is not wanted. Power must be where there are industries?—A. In Sikkim a concession for mineral rights has been applied for.

Q. Could not hydro-electric power be placed, say, in the hills, for the establishment of small industries, like cottage industries, in some way?—A. I am afraid the expense of distribution would usually be too heavy, unless they were grouped.

Q. I understand that in places like Norway and Sweden they have got small streams which are harnessed and small industries operated by such power?—A. In such cases it would usually be better to have your own water motor.* Near Almora and elsewhere in the Himalayas small water motors are used for grinding corn.

Q. Is there any opening for hydro-electric power?—A. The subject has not been fully gone into. The first thing is to see if the power exists; another is that, if there is a good source, it might be put on such a scale that the power could be sent for 100 miles or so, if necessary.

Q. Are there any industries so situated which would benefit by this power among the hills?—A. There are some industries that can be isolated. In Norway and Sweden they have started big industries. Some can be located where the power is and others cannot.

Q. You don't see any way of applying it fully to any industry?—A. I have not gone into the matter.

Dr. E. Hopkinson.—Q. Is that Calcutta night school the only means of instruction for apprentices?—A. Yes, in Calcutta.

Q. There are only 60 apprentices who are receiving any sort of instruction?—A. Yes.

Q. If a technological institute were established in Calcutta, is it intended that it should have evening classes?—A. Yes, they would be a prominent feature of it. It is a thing badly wanted, to do something for mechanical apprentices. They do not get as good a training as they ought to.

Q. Would the technical institute have any relation to the University of Calcutta?—A. We just touched on the point. We wanted to be separate.

Q. What would be the relation of such an institute to Sibpur?—A. The idea was to remove the Sibpur College from its present site and practically divide it into three parts, the higher engineering classes training for the Bachelor of Engineering degree being transferred to a new and purely residential college at Dacca. The main part of the rest of the classes would be sent to the technological institute. Those training in the mining class to the mining institute in the coal fields.

Q. And the industrial classes, what would become of them?—A. Our idea was to take a number of boys into the workshop, as is done at Sibpur. There they have about 40 boys in the workshop training to be mistries; at Dacca there are about 70 such boys in the workshops.

Q. Was the scheme in regard to the institute in any way connected with the appointment of the Director of Industries: were the two things put forward together?—A. No, the genesis of it was the suggestion of my predecessor Dr. Denning. He was working single-handed and he considered that it was necessary on general grounds to start a technological institute, with the incidental advantage that it would afford him the occasional assistance of expert engineers, chemists, etc., to help him in connection with industrial investigations and inspections. It had been suggested before, but the suggestion had not been acted upon.

Q. What would you suggest should be the relation of the Director of Industries and the school of technology?—A. That is a very difficult question. I ought hardly to have attempted to give an answer to Sir Thomas offhand. The matter needs very careful consideration, and I would like to think over it for a couple of weeks before giving an answer.*

Mr. A. Chatterton.—Q. You propose that industrial education should be under the Director of Public Instruction?—A. Yes.

Q. What is the amount of your budget?—A. For my own work I could not say; I would have to add up different items. You would include Dacca and Sibpur?

Q. For purely industrial education?—A. It is rather mixed; it is not separated in that way in our budget; it comes under a number of separate heads, and I could not say offhand.

Q. You say you have about 50 industrial schools. How many pupils, roughly, would there be in the 50 schools?—A. It is very hard to give an average. The number varies from 60, as regards industrial pupils, to 20; that would make it roughly 2,000.

Q. Have you any approximate idea as to the cost of training these boys under this system; how much per month does it cost to train these boys in these industrial schools?—A. I would have to work out these data. I could do it with the aid of this list, otherwise I shall be guessing in the dark.

Q. I would like to know what would be the cost of training boys in these industrial schools, as they exist at present, and of the boys who enter the school, the percentage who go

* See also additional written evidence printed after oral evidence.

through the full course of instruction?—*A.* I have fairly exact data in the case of a number of schools for that, but not for the whole lot of schools. I will, however, give the data* available.

Q. Do you inspect all these schools, or have you an inspector of industrial schools under you?—*A.* No, there are no inspectors under me.

Q. Do you inspect them every year?—*A.* No, I don't inspect all of them, only the chief ones.

Q. Are all these schools recognised by Government and do they get grants-in-aid?—*A.* No, about half of them. The number aided by Government would be about two dozens.

Q. Is there any industrial school on the Howrah side of the river for the training of apprentices in workshops?—*A.* No; Burn & Co., and Jessop & Co., send their boys over to the Calcutta night school. Most of the apprentices live in Calcutta. There is an evening school at Lillooch, 3 miles up on that side, for the Railway apprentices there.

Q. You say "in the mechanical engineering industry, the workshop is the best place for training the operative." Do these large workshops take apprentices; is there any scheme for drafting pupils who have been through an industrial school into such workshops as those of Burn & Co., etc.?—*A.* I bring to the notice of the school authorities the possibilities that there are in these works. The authorities of the Kanchrapara workshops said they would not reduce the period of apprenticeship in the case of boys from industrial schools.

Q. What is the period of apprenticeship?—Six years at Kanchrapara. In most workshops it is five years. Those boys that desire a mechanical training are advised to go direct into workshops.

Q. Do Government give any scholarships to these boys while under instruction in the workshops?—*A.* No. They are fairly well paid; they get an allowance from the authorities of the workshop.

President.—Q. Does any apprentice pay a premium as well?—*A.* Not in most workshops, but Burn & Co. take some premium apprentices as well as non-premium.

Q. They are paid from the day they enter?—*A.* Yes, in nearly all workshops.

Hon'ble Sir R. N. Mookerjee.—Q. They don't get anything in the first year?—*A.* In most cases they do. In 3 workshops there is no allowance for the first year, in 11 an allowance is given; in all, there is an allowance from the second year onwards.

Mr. A. Chatterton.—Q. You are in favour of the establishment in Calcutta of a permanent exhibition of machinery and processes, in which power, supervision and labour would be provided for the working of the machines and processes at certain times for purposes of demonstration? I presume you have in your mind something similar to the Gewerbe Museums in Germany?—*A.* Something like the one in Cologne.

Q. Have you formed any estimate of the cost of running such a museum out here?—*A.* We meant to start it in a small way.

Q. Do you realise the difficulties that such museums would entail in regard to up-keep, on account of deterioration through the climate?—*A.* I would propose to run it on a very much less elaborate scale than is done at home. I have not found excessively rapid deterioration in plant and machinery.

Q. One section of such a museum would be the weaving section?—*A.* I suppose that would be one section.

Q. If you had warps fitted to looms would you not find considerable difficulty in keeping them in order?—*A.* Yes, but I presume that as demonstration is possible at Serampore it would be possible in Calcutta.

Q. At Serampore the work is going on continuously?—*A.* Yes, practically except for a couple of months or so.

Q. Whereas the demonstration work in the museum would be done two or three times a year?—*A.* Yes.

Q. What other class of demonstration work would you have in such a museum?—*A.* Anything that is wanted in connection with the improvement of local industries.

Q. Will you have engineering workshops?—*A.* Yes, that would be one thing, *e.g.*, to show the use of improved tools, and special wood-working tools.

Q. In the industrial schools you say that from one-half to two-thirds are boys with scholarships; what is the range of these scholarships?—*A.* About Rs. 5 to 10 or Rs. 12.

Q. Who provides the funds for these scholarships?—*A.* In Government schools Government generally provide them; in some cases the District Boards.

Q. Speaking generally, do you consider that these industrial schools, in respect to the expenditure incurred in their maintenance, are serving any useful purpose?—*A.* I regard most of them as of comparatively little use.

Q. From these industrial schools have many of the boys found employment in the various Swadeshi factories that have been erected during the last few years?—*A.* I cannot say offhand.

* See also additional written evidence printed after oral evidence.

Q. Has the preliminary education in these industrial schools been found of such advantage that it was any inducement to take the boys into these factories?—A. I cannot say.

Q. Do these industrial schools keep any list of what becomes of passed students?—A. In the case of several schools I have had a list prepared. It is extremely difficult to prepare a full and accurate list, as the boys often cannot be traced after they leave.

Q. Do you think the attendance in these schools is largely due to the fact of the scholarships?—A. Yes, many of the pupils would not attend unless they had some attraction.

Q. What percentage of boys in these industrial schools are sons of artisans pursuing the same trade; what percentage are boys drawn into the school by scholarships, and more or less dropping things directly the scholarship ceases?—A. It is very hard to say. A considerable portion are the sons of mistries in some cases where I have made enquiries.

Hon'ble Pandit M. M. Malaviya.—Q. If you were to improve the course which you teach in these industrial schools would they not become much more useful?—A. Yes, they are open to improvement. One question is that of suitable teachers, and whether it is worth while spending more money on them.

Q. Supposing you had adequate funds and employed the right kind of staff?—A. They could be greatly improved.

Q. Do you also think that, in addition to the sons of mistries, the sons of bhadralogs would be willing to go in for such training?—A. A number have joined the artisan department at the Dacca School of Engineering. There they have better supervision, an European foreman is in charge, and some very useful work is being done. In answering your other question I was speaking of ordinary industrial schools.

President.—Q. Would it not be advisable to keep a register of each school, showing the origin of the boy and as nearly as possible his subsequent history?—A. We have done that as far as possible, and have fair data in the case of several of the schools. At Dacca I know there are a number of bhadralogs as well as sons of mistries. At Sibpur there were a few of the bhadralog class.

Hon'ble. Pandit M. M. Malaviya.—Q. We found the son of the late Dewan of a State working in the carpentry school at Bareilly.—Do you find that the bhadralog class are similarly willing not to take advantage of such a training?—A. Yes, there are signs of their beginning to take it up.

Mr. C. E. Low.—Q. Do you remember any instance of what happened to these bhadralogs in the artisan class in the Dacca School?—A. It has only recently been worked up. The numbers have doubled in the last few years.

Q. They have not begun to pass out?—A. The bhadralogs have not.

Q. You are aware that the Bengal Government submitted to the Government of India not very long ago a proposal for the appointment of a Director of Industries?—A. Yes, they sent up a proposal.

Q. Have the Bengal Government, or you, thought out what industries the Director of Industries Department was going to take up?—A. The case has not gone through me, but I believe that particulars have not been gone into.

Q. Have you yourself any idea as to the industries that should be taken up, because the scope and size of the department and the class of man would naturally depend on the kind of work he was to do?—A. Very much. I have considered what we might do in Calcutta. I have not gone into the question of village industries.

ADDITIONAL WRITTEN EVIDENCE (submitted after oral examination).

I submit two statements giving particulars on questions put to me at my oral examination, viz., (a) on the cost per pupil in industrial schools in Bengal, and (b) on the proportion of passed pupils suitably employed.

Another question was put to me by the President, which I preferred not to answer without consideration, viz., whether I thought that the proposed Calcutta technological institute should be under the Department of Industries or under the Education Department—supposing the former were established as a separate department under the Financial Department. The constitution of the proposed Department of Industries is entirely indefinite at present, but I assume that it will be somewhat on the lines of the Departments of Industries in Madras and the United Provinces. On that assumption, I consider that the Department of Industries would be an unsuitable organisation for managing the proposed institute, and that the present Directors of Industries of the United Provinces and Madras, however well qualified for their present duties, are neither of them qualified to control such an institute.

As I said in my written statement, mining education in Bengal and Bihar and Orissa is successfully managed by the Education Department under the advice of a Mining Board. The Committee on Mining Education proposed (in their Report 1914) to continue this arrangement; and Messrs. G. F. Adams, Glen George and Robertson, in their recent report (1916), written after a visit to England, repeat the proposal that the projected school of mines should be under the Education Department—although the suggested appointment of a

Director of Industries must have been known to at least two of these gentlemen when they wrote their report. Seeing that the success of this system is established it seems most inadvisable to make experiments with an untried organisation to which there are obvious drawbacks.

Some four years ago Government decided that a surveying school should be started at Mainamati and managed by the Survey Department. The Director of Surveys informed me, even before the school was opened, that he wished it were in the hands of the Education Department, and that if he had known what was involved he would not have proposed that the Survey Department should undertake it. He subsequently recorded the view that he had no objection to the Education Department's taking over the school. This case has some bearing on the question at issue.

The institute proposed in the 1913 report would be mainly and primarily an educational institution and should, therefore, be under the Education Department. If unlimited funds were available there might be an educational institute under the Education Department and also a separate research institute, under the Industries Department, consisting of a set of laboratories in which industrial questions could be investigated and a few students trained in this work by apprenticeship as assistants in the laboratories. But this would be extravagant besides having other drawbacks.

Industrial schools in Bengal.

The list in my office of technical, industrial, and special schools comprises 47 in all, of which 7 are Government schools, 28 are aided by Government grants, and 12 are unaided. It does not include some small typewriting schools, etc. From the list I have selected 28 schools which may be classed as industrial: I have omitted art schools, schools for deaf, dumb and blind, and certain orphanages which are rather charitable than industrial. Of these 28 schools, 17 are worked by missions, 5 by Government, 2 by District Boards and 4 otherwise. The total annual cost of the 28 schools is Rs. 76,000 for about 1,000 pupils, or an average cost of about Rs. 6½ per pupil monthly. Of this amount Rs. 40,000 annually, or an average of about Rs. 3½ per pupil monthly is contributed by Government.

Employment of pupils from certain industrial schools (including those pupils who leave prematurely).

School.	Authority.	Number of pupils who have passed out in the period considered.	Minimum percentage suitably employed.
Pabna	District Board	146	48 per cent.
Barisal	Government	42	77 "
Kalimpong (carpentry)	Mission	37	41 "
Mymensingh	District Board	24	71 "
	TOTAL	249	59 per cent. (minimum).

The balance of pupils includes those who have died, those who cannot be traced, and those who are employed on work unconnected with their workshop training. The actual percentage suitably employed is, therefore, greater than the figure given. I always urge the importance of keeping such records, but the difficulties are obvious and many pupils cannot be traced.

WITNESS No. 113.

MR. SATYA KINKAR SAHANA, representing the Kodarma Mica Mining Association, Mr. S. K. Sahan Hazaribagh.

WRITTEN EVIDENCE.

With the gaining ground of electricity as one of the best motive powers, mica, which is mostly used in electrical appliances, is growing into importance as an important and valuable article of commerce. Mica mining is an infant industry, not older than four or five decades, and it requires a careful eye for its proper development. Chotanagpur, Bihar, Orissa, Nellore (Madras), Sawar (Rajputana), Nepal and other places of India are rich in mica. But at present most of the valuable mica mines that are being worked lie in the districts of Gaya, Monghyr and Hazaribagh, especially Hazaribagh which heads the list.

Kodarma, a small village in the district of Hazaribagh, is the principal village of a Government Khasmahal of the same name. About 45 square miles of this Kodarma Government Khasmahal is a reserved forest with a fringe of protected forest around it. This reserved forest is very rich in mica and the Government granting leases under favourable terms and conditions, most of the principal mica mining firms have got their mines in this forest. Considering all this Kodarma may be termed the "centre of mica mining industry" in India of the present day. My field of action is limited to Kodarma and the adjoining places and my experience is solely gained in that field; so I venture to request the Commission to consider my statements with an eye to the limited nature of my experience.

Though mica is such a valuable article of commerce and the infant industry of mica mining requires careful looking after for its proper development, yet for various reasons, it is not growing as it should have done. I try to enumerate some of the difficulties in its way and to explain how they prove drawbacks on the mining industry.

Forest Department. 1. (a) *The existence of the reserved forest.*—The theft of mica and the destruction of pillars and the consequent lessening of the longevity of mines are the crying evils of the mining industry. The presence of the forest, dense in bushy and grassy growth, gives shelter to wild animals and thieves and robbers and makes the mines less accessible to mine owners and their men than they would have been if the mines were on open land as are the coal mines generally.

The income of the Kodarma reserved forest from the mining lessees is more than six times its income from forest produce. The forest is full of trees which seldom yield any valuable timber. The soil is so unfavourable to the growth of sal trees, which are the only valuable trees in this forest, that most of these trees are top-dried and there are few trees in the jungle the girth of which is above 10 inches in diameter. Considering all this the depletion of the forest should be suggested to the Government.

In case the depletion of the whole forest be considered undesirable for other reasons, setting up of villages within the forest may be suggested. Before the forest became Government property and kept as reserved there were many villages within its ambit. If such villages be set up now, they will be to the advantage both of the forest department and the mica mining industry; the labour problem that has been growing more difficult every day will be partially solved by the setting up of such villages.

(b) *Want of roads in the forest.*—In the beginning of the industry pits were made only in those places where the surface indications were very hopeful and so only surface mines yielded sufficient mica at little cost. But now that such surface veins have mostly been worked out deep mining is necessary for getting mica. In deep mines heavy machinery is necessary for the purpose of keeping water out of the mines. But for want of roads the mine owners feel immense difficulty in carrying the heavy machinery to the pit-heads; so much so, that sometimes the carriage cost is more than the actual cost of the machinery itself. Government should open up the forest with a few main roads and feeder roads to them. The mine owners pay a good amount in road cess; every pice of that amount should be spent in making roads; the Government should further pay a little from the income of the property for its development.

(c) *The way in which timber for the mines is supplied to the mine owners at present.*—Timber is necessary for the mines and the mine owners get necessary timber from the reserved forest. If the forest be not depleted it is reasonable that the necessary timber be supplied to the mine owners as conveniently as possible. Formerly the mine owners used to get the timber from the vicinity of their mines; but for the last few years the coupe system has been introduced. From the diminution in consumption of timber from the coupes and the bringing in of timber from other places by the mine owners it is evident that the coupe system has proved a failure. The introduction of the old system of timber supplying may be suggested to the Government.

(d) *The compensation realized from mine owners for trees felled in prospecting or mining work.*—Whenever a prospecting licensee or mining lessee in prosecuting his operations is compelled to clear a part of the surface land of trees the forest department following the "Rules regarding Prospecting Licenses and Mining Leases for Mica" and "the Forest Manual" often demand and sometimes realize heavy compensations from him. For facility of prospecting and mining work the compensation system should be abolished or made nominal.

2. *The way in which leases are granted, specially by private Zamindars, to irresponsible persons.*—Thinking mica mining to be a very profitable industry which can be carried on at a very small cost, persons who have very little capital, somehow secure prospecting licenses and mining leases in private zamindari and sometimes even in Government land. These men make holes up to twenty or twenty-five feet deep, and then, finding the mine not up to their hopes give it up, destroying the pillars when leaving it. Perhaps that mine pushed a few feet ahead, would have turned into a good mine. But the destruction of the pillars ruins the future prospect of the mine by making it too costly or impracticable for a second man to develop it. Some law preventing such destructive work should be suggested to the Government.

Marketing.

3. *Want of mica market in India.*—Though most of the mica produced in the world is from the mines in India, it is wholly consumed in the countries of Europe and America. The mine owners, especially the Indian section of them, from their ignorance of the proper value and

use of mica, sell their mica to middlemen shippers at a small margin. These middlemen often make the enormous profit of two to three hundred per cent. The mine owners from the nature of their profit do not consider the mines to be valuable properties and consequently neglect their development. Some way should be found out by the Government for helping the mine owners in getting their due share of the profits and so giving them an incentive to develop the mines.

4. Want of knowledge of the proper use of mica and the consequent want of a manufacturing industry is a great drawback to the industry. India, as in various other departments of trade, supplies the raw material only in mica. Micanite, chimneys and other articles are all prepared out of India. The people here do not know in what way mica is used; there is a mystery enveloping the mica business. The institution of pioneer or demonstration factories may be suggested to the Government.

5. *Spread of a knowledge of proper mining and manufacturing.*—The institution of pioneer and demonstration factories will not suffice to remove the ignorance prevailing. The appointment of an expert to give advice to the managers and officers in charge of mines and factories on mining and manufacturing of mica and generally about the way it is used should be suggested to Government.

6. As is natural a limited and defined area is leased out by a lease. But in the case of mines situate in villages it often happens that the lessee, following the vein, finds himself encroaching on the adjoining ground which is the occupancy holding of a tenant. According to the prevailing law the lessee must acquire the right of the tenant by giving him full compensation or stop the mining operation. But the tenants in such cases often demand such exorbitant compensation that the lessee is compelled to stop work. If the lessees, in such cases, had the land acquired for him under the Land Acquisition Act by the Collector of the District, many disputes and disturbances would be avoided. The introduction of such a law may be suggested.

ORAL EVIDENCE, 6TH DECEMBER 1915.

President.—*Q.* I understand that you are representing the Kodarma Mica Mining Association. We have asked other members of your Association to consider what practical means can be adopted for restraining the practice of mica thieving. It has been suggested that it is practicable to stop all transport of mica at night, and also for all the mica in the Kodarma area to be assembled at certain depôts which should be recognised as the only depôts through which the mica should pass out of the district. Will your Association consider these proposals?—*A.* The proposals will go a little way in stopping the thieving of mica. Because the thieving of mica is generally done at night by the coolies when the mines are not worked by the mine owners.

Q. If it were made penal to carry mica at night do you think there would be a stoppage of this practice?—*A.* It is rather difficult, because the mines are far away and the forests are all infested with wild animals and they are inaccessible even in the day time.

Q. Perhaps the law could provide for certain people to take passes for carrying mica at night. Your note is so full and clear that we shall consider the statements contained in your written evidence. Will you discuss these proposals with your Association?—*A.* I shall.

WITNESS NO. 114.

MR. E. HOOGWERF, A.M.S.T., *Principal, Government Weaving Institute, Serampore, Bengal.* Mr. E. Hoogewerf

WRITTEN EVIDENCE.

The industrial development of India, is a problem, which does not offer a very easy solution, the economic and industrial conditions being different in almost each of her provinces. In these circumstances an effective and general remedy falls short of the mark. The question has many aspects, and the solution of the difficulties necessarily requires individual diagnosis.

India once held a commanding industrial position in the world, which she has now lost, by her apathy and conservatism in not keeping pace with her more formidable industrial and commercial competitors.

The Indian artisan, in most of his handicrafts and methods of work, is more than a century behind time, and even at this stage, he is reluctant to adopt the improved methods of work and machinery, which gave his rivals the start, and caused a decay of Indian industries.

The salvation of the Indian artisans, does not lie in their obtaining foreign markets, but in regaining the home markets they have lost, in which the advantages are in their favour.

The main impediments to the advancement of industries and trade are a lack of money and market. As regards the first, sufficient capital is obtainable in India, although the native capitalist is prone to lock up money in landed property, or in Government banks, rather than to invest his capital in less certain exploitations. The general movement in

India at present, of promoting co-operative work and of instituting central and rural banks has in some Provinces tended to give an impetus to agriculture and cottage industries, thus supplying a much needed want. This movement is spreading rapidly, and the people of the country, both artisans and capitalists, are now taking to it more kindly.

The other difficulty, *viz.*, that of the artisans obtaining a market for their goods, is a problem which cannot easily be solved for reasons already stated. It will be necessary for the artisan to rouse himself to greater efforts in industrial improvements by removing the obstacles which have led to the decline of Indian handicrafts.

The needs of the present war, which has caused a demand for the supply of local-made goods and products, to some extent, have brought the consumer more in touch with the local manufacturer for his requirements, which indicates that India still possesses great manufacturing possibilities, if funds are forthcoming and markets are obtainable.

For the introduction of improved machinery, I would recommend the employment of peripatetic instructors whose duty it would be to demonstrate practically improved methods of work and machinery in the villages, and further to instruct the cottagers, by means of lectures, and also to bring them in touch with merchants for the sale of their goods and the purchase of their raw material. I advocate this system of instruction for the artisan classes rather than through the medium of technical and industrial district schools, as a fair proportion of the artisan classes who depend partly on cultivation and partly on industrial work are averse to leaving their homes.

Technical and industrial schools have their limitations, and for them to be a success it will be necessary for improved machinery and methods of work to be introduced previously in the villages, thus creating a demand for higher instruction.

Having commented generally on the subject of the development of Indian industries, I give below the replies to the list of printed questions supplied.

Q. 1.—I have not been directly concerned in the raising of capital for industrial enterprises, but I have on more than one occasion had to assist in bringing capitalists together, to form private companies in order to start small factories such as rice factories, cotton, ginning and pressing factories, etc. The proprietors of these factories were generally persons who had an intimate commercial knowledge of these particular industries, and were already engaged in trading in the raw material. The task of bringing these capitalists together was not difficult, as it required merely a little tact in introducing the parties concerned, and later of assisting them in the selection of suitable machinery to treat the raw material. As regards the business side of the question the capitalists required no information as they were already acquainted with the market conditions and were in a position to calculate profits. I have also had some experience, since coming to Bengal, of starting small hand loom weaving factories pioneered by youngmen who saw possibilities of success. These youngmen in most cases opened business on a very modest scale owing to limited funds which were just sufficient in most cases to purchase the plant and to defray the working costs of the factories for a couple of months, hoping that in a short time assistance would be forthcoming from capitalists, who had promised to financially assist them and to market their goods. In several cases I believe that the working capital promised failed to be supplied, with the result that most of the young adventurers, who were enterprising enough to open such factories, had to close business after working for a year or more. In other cases, owing to the interference of the young men's relatives, the factories did not work more than two or three months. Hand loom weaving factories, properly financed and opened under favourable conditions, with an adequate plant of machinery, have succeeded fairly well in some parts of India and are acknowledged as profitable investments.

In south India the Bassel Mission, after continued efforts of about twenty years, has established this fact, and there are at present several weaving factories working satisfactorily. In Japan, China and in some parts of Europe, hand loom weaving factories have been found by smaller capitalists to be quite a good investment for their money, and I feel certain that such factories would also give equally good results in India if they were properly financed and managed.

Qs. 2 & 3.—There are in India certain sects of people who depend entirely on trading and money lending. These sects possess very keen business instincts, and whenever opportunities offer of investing their capital lucratively, they are not averse to doing so, especially if assured of success by a reliable authority, who can be depended on to assist them in their enterprise. These classes of people do not, as a rule, possess sufficient educational qualifications and are hence dependant, for their shortcomings, on others who are better informed than themselves especially in technical matters. These trading classes attach great importance to seeing things for themselves, and wait patiently for others to give the lead and when convinced of the success of the experiment they readily follow suit.

Pioneer demonstration factories, if established according to the requirements of each Province, would be useful in promoting and developing industries. The ginning and pressing factories in the cotton growing districts, the rice mills, the coir and oil mills of South India are examples which may be cited in support of my statement. The number of these factories has increased so rapidly during the last fifteen years that they cannot now be maintained in full time employment. Combines have in consequence been formed to protect these industries but in spite of the measures taken, a large number of factories are annually stopped for the want of raw material.

Q. 4.—As regards financial aid by Government to industrial enterprises, I do not think that much direct assistance has been rendered, although the efforts of Government so far seem to have been directed more towards instructing the industrial public through the medium of technical and industrial schools, on which much money has been already spent. These institutions are becoming more popular. Government assistance.

Q. 5.—The methods enumerated under the heading of giving Government aid to existing or new industries will depend on the local conditions of the various Provinces of India, and I am of opinion that no hard and fast rule can be laid down in this connection. The solution should be left entirely to competent authority employed in the promotion of the particular industries.

Q. 6.—Government control should exist in all cases where Government capital is concerned, in order to determine whether the money is being utilised satisfactorily for the object for which it was given.

Government control can best be exercised as follows, by adopting a system of inspection similar to that exercised in connection with the co-operative credit societies, viz.

- (a) by active inspection of factories, to which Government aid has been granted by officers specially appointed for the purpose;
- (b) by the checking and auditing of accounts.

Q. 7.—I regret I have had no experience of factories pioneered by Government.

Q. 8.—As regards the question of Government pioneering industries, this may be done by a system whereby the cottagers could be instructed at their homes in improved methods of work, and by the introduction of modern machinery suitable to their requirements, which could be supplied to them through the medium of co-operative societies or rural banks. The loans for the supply of raw material and machinery could be recovered from the artisans in easy instalments. Secondly, as regards organised industries, mercantile firms and importers of machinery should receive assistance from Government to establish pioneer factories which will enable Indian capitalists to determine whether such concerns are profitable or not. The present importance of the following industries is due entirely to European enterprise which proved to the Indian capitalists that such factories were lucrative investments for their money:— Pioneer factories.

- (a) Cotton ginning and pressing factories,
- (b) Rice mills,
- (c) Coir factories,
- (d) Oil seed pressing factories,
- (e) Saw mills,
- (f) Spinning and weaving mills,
- (g) Carpet factories.

I am averse to the policy of Government entirely financing industrial enterprises and mills, as there seems to be no necessity for such measures.

Q. 9.—Most of the cottage industries, such as weaving, sericulture, metal working, etc. are hampered by the present conditions under which they are financed by private traders who supply the raw material to the artisans and take back the manufactured articles after paying the manufacturer just a living wage. They also advance capital to the cottagers at high rates of interest, so as to have a firmer hold on them. The co-operative movement in India has to some extent encouraged industries by forming co-operative societies, financed through rural or central banks. The present rules and laws, however, of the co-operative societies call for revision and modification, to make them applicable to certain industries. These societies have been very helpful in affording assistance to the artisans in tiding them over difficult times, in enabling them to purchase their raw material at wholesale rates, and in marketing their products. The co-operative movement is still in its infancy and much remains to be done before its methods of work can be made efficient, and the people of the country realise their advantages and take to it more kindly. Financing agency.

Q. 10.—The institution of banks, central and rural, has been most useful in meeting in a small way the financial requirements of the artisans and others industrially employed, but hitherto the funds at the disposal of the banks have been limited, due probably to the fact that the capitalists have not much confidence in them. These banks could be considerably improved if placed on a safer footing by Government, and they would thus be able to render more substantial aid to larger enterprises. The paucity in number of these banks has also tended to retard progress in the number of co-operative societies.

Qs. 11 & 12.—The cottage weaving industry has, especially in some provinces, derived a fair amount of assistance by the establishment of co-operative societies. Co-operative societies should be established to assist most of the unorganised industries. Co-operative societies.

These societies are helpful to the artisans in partly removing the two impediments to the progress of the trade and they have rendered financial assistance to the artisans for purchasing raw material and marketing their goods. Many industrial co-operative societies were started, but several of them have not yet proved a success, which I think is due in a great measure to the want of active supervision and of an adequate staff of inspectors to instruct the artisans.

in improved methods of work and in the introduction of improved machinery. For the co-operative movement to succeed it will be necessary to gain the confidence of the people, and this can be done by the employment of expert inspectors to assist them in removing their difficulties, and by obtaining the assistance of philanthropists to interest themselves in the advancement of co-operative work.

Limits of
Government
assistance.

Q. 13.—Government aid should be given merely to promote and strengthen existing and decaying industries, not with a view to competition but to stimulate and revive their conditions.

Q. 14.—Government aid should be extended to enterprises after a thorough investigation as to the possibilities of their regeneration and success. The support or aid should be continued until the conditions have been improved, and the industries are put on a sounder footing. The revival of decaying industries will in most cases take years to accomplish hence prolonged and strenuous efforts are needed. The departments or officers entrusted with the promotion of these industries should be given more latitude than at present.

Technical aid.

Qs. 15 & 16.—I have been entrusted with the carrying out of a scheme intended for the revival of the hand loom weaving industry of Bengal. This scheme was brought into force in the year 1909, and since then the efforts of the Education Department have mainly been devoted to imparting instruction to the weavers in modern methods of work, and in the introduction of improved looms and preparatory machinery. Judging of the merits of the scheme from an educational standpoint I may state that the various district schools, which have been established in conjunction with the central institution, Serampore, have met with success inasmuch as these schools have been well attended and the batches of students passed out annually from the institutions have acquired sufficient knowledge to enable them to enhance their earnings on their return to their villages. These industrial schools have met, in a small measure, the needs of the Bengal weavers, but I do not consider that the hand weaving industry of Bengal will be revived to any great extent, or will receive the impetus necessary, until the present scheme is combined with a more effective means of instructing the masses of the weavers of the country. As regards the financial side of the question, until co-operative societies have been established in every village Government aid will be necessary for the purchase of the machinery.

Q. 17.—The loan of Government experts should be made to private firms or companies, if they require their assistance. If the loan of a Government officer is likely to last longer than for a period of one month, the private firm should be called on to meet the whole or portion of his salary.

Q. 18.—The results of any research or original work done by Government experts while with private firms should be carefully collected and submitted for the information of the department to which they belong. The Director or head of the department should record the results of all such research work, and he should be permitted to publish, with the consent of the firm, such results as would be a benefit to the industrial public.

Demonstration
factories.

Qs. 19 & 20.—In Bengal the hand loom weaving industry stands next in importance to agriculture, and as such greater efforts should be made to promote this particular industry on the lines suggested above, and also by establishing on a modest scale two or three hand and power pioneer weaving factories in some of the more important weaving centres to prove to the capitalists that such enterprises are not merely exploitations, but are a good investment to them. These pioneer factories may later on be handed over to those who are likely to run them efficiently, and have business connections and sufficient working capital at their disposal.

Research abroad.

Q. 21.—Research abroad has had the effect of convincing and removing from the mind of the manufacturer any doubts he may have had as to the possibilities of success in the working and disposal of manufactured goods. Research abroad has also brought local manufacturers more closely in touch with manufacturers of other parts of the world where industries were found in a more developed condition.

Q. 22.—The Imperial Research Institute should be given facilities of benefiting by the results of research work in the United Kingdom. This I think may conveniently be done by affiliating the two institutions.

I do not however consider any provision necessary at this stage for the research of special subjects in the United Kingdom, unless perhaps difficulties exist at present in connection with some of the organised industries, as the proposed Indian Research Institute or Institutes, if provided with an efficient and competent staff, should be able to cope with these difficulties.

Q. 23.—The Advisory Council for Research in the United Kingdom may possibly assist Indian industries, by its being more in touch with the Government industrial departments of India.

Q. 24.—I am averse to the idea of research problems being referred to educational institutions and colleges for solution, as such institutions cannot sufficiently cope with the work. Research Institutes should be separate units, specially equipped and staffed for this particular duty.

Surveys for indus-
trial purposes.

Qs. 25, 26 & 27.—I consider that Research Institutes should be entrusted with the conduct of surveys for industrial purposes and, if found necessary, assistance in conducting these surveys should be afforded by local industrial departments,

The results of such surveys and recommendations should be referred to the local Government and a suitable experimental scheme for the improvement of the industry concerned, should be introduced.

Qs. 28 & 29.—Commercial museums are no doubt useful institutions, inasmuch as Commercial they afford facilities to commercial men in examining and knowing where raw material and museums. finished products can be obtained, but for such institutions to be of real good to the country, each district, or at least each division, should have its own museum, in which the specimens of raw material and finished products should be carefully preserved for the use of those interested in commercial and industrial work. Lists should also be printed and kept up-to-date, specifying the quantity and quality of the products available, and the prices at which they can be obtained from local merchants. These museums need not be established on a grand scale, but should be sufficient to meet the requirements of local merchants.

Q. 30.—Commercial museums and sales agencies, if established in the principal towns Sales agencies. of India for the display and the sale of the products of unorganised cottage industries, would meet a much needed want. These sales agencies, to be popular, ought to have sale representatives, not Government officers, but firms that would be willing to transact business on a commission basis.

These sales agencies would be most helpful to the artisans, as through their agency co-operative bodies could dispose of the goods of the artisans with greater facility. The artisans would not be obliged to spend their time in hawking their goods about and to depend on retail sale.

Sales agencies could effectively be connected with commercial museums, and the cost of both institutions could be partially met by a fee being charged on all goods placed for sale there. These sales agencies could also display samples of imported articles for which there is a demand in the country.

A number of local sales agencies or deshi shops already exist in the country, whose business it seems to be to market Indian manufactured goods. How far they have been successful I do not know, but judging from appearances they seem to command a fair trade.

Q. 31.—The institution of periodical industrial exhibitions would undoubtedly assist, Exhibitions. if run on proper lines, but hitherto little or no advantage has been gained by the industrial public from these exhibitions, except perhaps that some exhibitors were able to dispose of a portion of their stock of goods.

Q. 32.—It still seems premature for these industrial exhibitions to be of any practical value to the people of the country, but if Government would adopt means whereby the zamindars and philanthropists of the country would join hands in making these exhibitions a success they would have a beneficial effect and should serve as a source of information to the industrial classes.

Q. 33.—The main object of these exhibitions should be to display the products of the country, finished and unfinished, and their methods of manufacture. The capitalists and other leading gentlemen should be asked to assist in the introduction in their villages of improved machinery and appliances which would be suitable to the cottagers. I attach great importance to this particular form of assistance from the leading people as much depends on them in assisting the experts and other Government officers in promoting industries by removing from the minds of the villagers any prejudices they might have.

Qs. 34 to 36.—The appointment of trade representatives in Europe and in the Colonies Trade representa- to represent Indian interests and to open up new markets abroad, as far as the raw material tives. available in the country is concerned, would decidedly strengthen the present condition of the Indian export trade and at a later period with the development of industries the country would also benefit by it; but at present India is not in a position industrially to face competition. Her salvation lies in regaining her home markets, as I have said before.

Provincial trade representatives would also assist in promoting local trade and in rendering facilities to manufacturers in disposing of their goods.

Hitherto these responsibilities rested with European and Indian commercial houses, and they have done much in securing for India markets for her exports.

These firms are wide awake to their interests, and, if given possibilities of further business, they would not be backward in availing themselves of the opportunities and support if offered by Government.

The only recommendations that I can make in this matter is to follow on the lines adopted by Japan, America and Germany, in obtaining markets for their industrial products and in taking advantage of conditions favourable to them for the purchase of raw material.

Q. 37.—The principal purchasing departments of Government could assist Indian Government patron- industries considerably, by publishing lists of articles required by them, and by obtaining age. local manufactured articles from co-operative societies, local firms, etc., on lines indicated by me before. The publishing of lists of the articles, with the prices at which Government is willing to buy would not be advisable. What may be done is for the heads of the purchasing departments to invite quotations, or tenders, for their requirements. Particular care should be taken to see that the articles supplied by the merchants or co-operative bodies are exactly as per approved samples.

Training of labour.

Qs. 44 to 49.—The skill and efficiency of the labourer, can effectively be improved by introducing a system of village instruction whereby the cottagers could be taught modern methods of work and the use of improved machinery at their villages. Simultaneously, through the medium of the co-operative societies and banks, improved machinery could also be readily introduced. I have tried this system of work, on a very modest scale, in some of the villages, while on deputation in other provinces, and the results are encouraging. I have found that improved machinery can be readily introduced and instruction can be more easily imparted to the artisans by the employment of an efficient peripatetic instructor, or by temporary village schools. The villagers while under instruction, however, require subsistence allowances, without which few of them can afford to devote a portion of their working hours to study modern methods of work.

This system of instruction has been found most effective as regards hand loom weaving and it should answer the purpose equally well for industries of a similar nature, namely sericulture, silk reeling, spinning, gur making, dyeing, and a number of other minor handicrafts.

Referring to the industrial schools of Bengal I may state that they have annually turned out batches of successful students, but such schools cannot materially help in the regeneration of decaying industries as the numbers they pass out are inappreciable as compared with the masses of the country employed in industrial pursuits. If any radical improvement is to be made a system of village instruction must be introduced and the work of the instructors must be actively supervised.

The system of training apprentices in factories and workshops has, I believe, met with a fair measure of success, as for instance the apprentices trained at the various railway and engineering workshops, mills and factories have in the majority of cases turned out efficient workmen. These men however lack a theoretical knowledge of the subjects. Night schools, or classes similar to those introduced in Europe, would be useful and they would no doubt tend to turn out more competent workmen.

Q. 50.—Technical and industrial schools should, I think, be placed under the control of a separate Department of Industries, especially in provinces where the number of educational institutions are numerous, as the Educational Department can not spare time to devote to the development of industries which have hitherto been believed of minor importance. These departments are closely connected with each other in educational matters and may be considered as sister departments. They should be placed under the General Secretary to the Government, Education Department, but should have separate budget allotments for each department. The Director of Industries should be a Joint Registrar of Industrial Co-operative Societies, as I have found from experience that industries cannot be developed sufficiently under the present system.

Supervising and technical staff.

Qs. 51 to 53.—For the improvement of Indian supervisors and skilled workmen already employed in factories, engineering workshops, and mills, who would be willing further to improve their capabilities, Government assistance in sending them to foreign countries, to learn more up-to-date methods of work, would be useful. By Government assistance I mean that the authorities of the mills and engineering workshops should also assist, and they should guarantee employment and better prospects to such of their employés, on their return, who have been enterprising enough to improve themselves.

I hardly think that it will be necessary to afford facilities to technical experts of private firms, as such men have constant opportunities of returning to Europe where they as a rule acquaint themselves with all recent improvements and up-to-date methods of work. In certain cases mercantile firms, when they know that it is to their advantage, send their men to England to acquire the necessary information.

As regards officers in Government employ, the facilities for their studying trade conditions in foreign countries, and thus of keeping pace with the advancement of industries, are not sufficiently encouraging and permission to do so is not easy to obtain. Speaking from experience I consider that the deputation of officers to foreign countries to study the conditions and methods of work, where certain industries are more advanced, is most necessary, and greater opportunities should be given to Government experts of acquiring special information.

Mechanical engineers.

Q. 54.—I believe there is a difference of uniformity in the standard of examinations for mechanical engineers held in the various provinces. This difficulty may be removed by the written and practical questions being set to the candidates on lines similar to the examinations conducted by the London City and Guilds Institute. The arrangement is that the examinations are held on the same date throughout England and the Colonies, and the candidates are required to pass the same written and practical tests. These being the conditions, a uniformity of test would exist and any differences of opinion would be removed.

Q. 55.—It seems necessary that all those in charge of prime movers should possess Government certificates of competency. In the case of qualified men from England, if the examinations they have passed are of equivalent standard to those of the Indian examinations, there should be no objection raised to their being placed in charge of prime movers.

Official organization.

Q. 56 to 60.—The development of industries in this province rests with the Bengal Educational Department. A Superintendent of Industries assists and advises the Director in matters relating to technical and industrial education. This officer's time is mainly

employed in attending to official correspondence and in inspecting technical and industrial schools to maintain them to the required Government standard of efficiency.

The present organisation does not satisfy the needs of the province. For the effective development of industries a separate department should be created in the Education Department with a Director of Industries at its head. The Director should have at least three expert inspectors to assist him in the development of the industries of the province. This department should have separate budgetted funds. The Director of Industries should be a business man and should also possess a fair knowledge of at least one of the primary industries of the province.

I do not consider that a Board of Industries is necessary for the present.

Q. 62.—The most suitable form of machinery to correlate the separate activities of the various Provinces as regards industries may I think be suggested in the formation of an Imperial Research Institute, which will tend to avoid the repetition of research activities in provincial technical institutions and colleges.

Q. 64.—The formation of an Imperial department would be useful for the promotion of Imperial organised industries, *viz.*—chemistry (including agricultural, metallurgical, tinctorial, and pharmaceutical chemistry), the leather and hide industries, glass making, sugar and alcohol manufactures, paper making, and oil seed industries. dep
ments.

Q. 65 to 66.—As to the nature of the administration, the heads of Imperial and Provincial Departments, should not be purely advisory, but should be vested with administrative and executive control.

The Provincial Industrial Departments of each province, should be assisted by managing committees consisting of official and non-official members. The Presidents of these committees should be the executive officers of the districts of the provinces.

Q. 67.—When the services of any imperial experts are placed at the disposal of a local Government he should abide by the rules of the department in which he is placed. As regards the salary, allowances, etc., of the officer whose services are loaned, these should be sanctioned in accordance with Government rules applicable to officers on deputation in other Provinces.

Q. 68.—Local Governments should have power to engage their own experts when necessity occurs for improving unorganised or cottage industries. Provincial dep
ments.

Q. 71.—Technological research institutions may best be developed as Imperial institutions, and they should, if possible, be made to fit into a general development scheme for the whole of India. Technological i
stitutions.

Q. 72.—As regards investigation and research, I am in favour of each research institution dealing with a limited group of related subjects.

Q. 73.—Government control of these research institutions seems necessary, and these institutions should be placed under the Imperial Government.

Q. 74.—It is very necessary that measures should be taken to co-ordinate and prevent the unnecessary over-lapping of research activities in Government technical and scientific departments. The work of such institutions can best be controlled and directed by the Imperial Research Institutes, *viz.*, by technical and scientific departments making a reference to the Imperial Research Institute before the work is taken in hand. Co-ordination
research.

Q. 75.—The activities of the Science Congress have possibly led to enquiries being held by Government into matters relating to improvements.

Q. 76.—With the establishment of Imperial Research Institute the deliberations of the Congress may be referred by that body to the Imperial Institutes for consideration and action.

Q. 84 to 88.—Trade and industrial journals should certainly receive the encouragement and support of Government as they are most useful in providing information to those who are connected with industries. The monographs written from time to time on Indian silks, and vegetable dye stuffs, procurable in the various provinces, have been useful to me in my particular line, *viz.*, in the promotion of the hand loom weaving industry of Bengal. I have no doubt that similar publications on other subjects have been equally beneficial to those who have needed them. The dissemination of information of this kind through the various vernaculars would be of use to the artisan classes. Industrial and t
journals.

ORAL EVIDENCE, 6TH DECEMBER 1916.

President.—Q. I understand that you are a mechanical engineer with experience in weaving?—A. Yes, I am a mechanical engineer, I also know weaving and I have served my time in the mills.

Q. When did you come to India?—A. In 1907 I returned to India.

Q. Have you been in charge of the Serampore Weaving institute since 1907?—A. No, I came out on a three years agreement for the firm of Greaves Cotton and Company and although I had seen the authorities in South Kensington in 1906, I did not get my appointment till November 1908.

Q. You have answered most of the questions. Did you read the instructions which were issued with the questions in which witnesses were asked to confine their evidence to matters within their actual experience. Do you want us to suppose that you have experience of matters referred to in all these questions?—A. Yes, I think that as far as the questions concern industrial and commercial work and my special line of business.

Q. We know that most of the questions have some bearing or other on industries, including that in which you are a specialist. Your evidence has been swamped by your giving advice on questions that are not obviously within your experience and I cannot see how many of them will help us in any way. In answer to question 13 you say that Government aid should be given merely to promote and strengthen existing and decaying industries not with a view to competition but to stimulate and revive their conditions. That is a very obvious statement to make, but we have to advise Government as to practical steps. Then again in answer to question 22 you say that the Imperial Research Institute should be given facilities for benefiting by the results of research work in the United Kingdom and that this may be conveniently done by affiliating the two institutes. What two institutions are there?—A. As regards the practical steps to be taken I could suggest suitable measures to stimulate and revive decaying industries if necessary. I refer to the Imperial Institute which I proposed should be established and its affiliated provincial institutions.

Q. You mean one here and one in the United Kingdom?—A. No, I mean an Indian Imperial Institute and the others referred to are the provincial institutes which should be closely connected with each other and affiliated to it.

Q. In answer to Q. 75 you say that the activities of the Science Congress have possibly led to enquiries being held by Government into matters relating to improvements. Do you know of any enquiries?—A. I think there have been several enquiries constituted from time to time but I cannot at the moment remember the nature of them.

Q. There is no use in stating a matter in general terms. It is much better to confine your attention to points in which you could give precise evidence. Weaving is obviously in your line. You have done a good deal of excellent work in Bengal. We should like to hear your views in the matter of training that can be imparted with a view to saving the weaving classes of Bengal from the effects of the power loom and whether there is any hope of doing that. They are a very large class? Mr. Low will ask you some questions as to what you are doing and what results have been obtained in trying to develop this weaving industry in Bengal.

Mr. C. E. Low.—Q. Have you any idea of the hand loom weaving population of Bengal?—A. We might take their number at about 12 lakhs.

Q. You mean actual workers?—A. Yes.

Q. You speak of a number of cases in which bhadralog students of your factory attempted to start small weaving factories. Did they work with their own hands or did they employ artisans?—A. In most cases they have had to start the factories themselves and afterwards to engage weavers to work the looms. In the case of Hattersley looms, the ordinary weaver does not know their mechanism. These bhadralog young men have had to put up the machinery and to teach the people before they started the factory.

Q. Are any of these collections of looms working successfully now?—A. Yes, I think a few of the factories are still working. Many men started but owing to the lack of working capital several of them had to close down.

Q. The artisan weaver has not much working capital?—A. No, he gets his capital really speaking from the mahajans.

Q. When you get a somewhat larger organisation, you want working capital and this they could not get?—A. That is the main reason of the failure of these factories.

Q. Is there any class of textile hand loom made goods in Bengal for which there is a big organised demand?—A. There is a great demand for silk cloths of all kinds, cotton chudders, saris, dhoties, and the coverlets used during the cold weather in Bengal.

Q. Who markets the products of the hand looms?—A. It all depends upon the financial status of the weavers but as a rule the mahajans market them. In Serampore we have five or six mahajans who buy up all the products of the looms and sell them at about pooja time. It is the same thing in Bankura, where there is a big business done in chudders. Similar conditions exist in the other districts of Bengal, Chittagong, Pahnna, Malda, Kushtia, Nadia, etc.

Q. What connection have you had with the co-operative credit movement of Bengal?—A. I have had practically nothing to do with it, except that I assisted in opening some co-operative societies.

Q. Do you know the extent to which there are co-operative societies among weavers?—A. I do not think there are very many societies in Bengal. There may be just two or three at present working satisfactorily.

Q. I do not mean societies for co-operative purchase and sale. I mean credit societies which get money lent to weavers?—A. I believe there are only two or three such societies.

Q. You seem to express the opinion that technical instruction should precede co-operative organisation. Have you considered the possibility of doing it the other way round?—A. I am of opinion that co-operative societies should first be started.

Q. I agree with you but you have expressed the contrary opinion. That may be due to the paucity of co-operative weaving societies in Bengal?—A. That may be a clerical error, but really speaking co-operative credit societies should be started first, and if this is not done we cannot possibly expect to gain the confidence of the artisans, nor will it be possible to induce the artisans to purchase improved machinery without the necessary capital.

Q. What is your organisation for demonstrating the results of your work?—A. In addition to the central institution at Serampore, we have got five outlying district schools, through the medium of which the weavers in the districts receive instruction in improved methods of weaving with modern machinery. The results obtained in promoting the industry have been very satisfactory.

Q. Don't you think that in the matter of teaching a particular process, demonstration is a more ready and extensive way of doing it?—A. Yes, I quite agree with your views and that is what I have suggested also to my department.

Q. Why is there not a demonstration staff attached to the factory?—A. Attempts have been made to obtain sanction from Government from time to time but they have not been successful.

Q. Can you tell why Government did not favour the idea?—A. I have no idea. The Superintendent of Industries sends up such cases for the orders of Government.

Q. Where are the five schools you refer to?—A. One at Bankura, one on the Burma frontier, one at Pabna, one at Malda and one at Tangail.

Q. Do these schools move about?—A. The original idea was that they should move about from village to village in each district till the weavers of the districts had learnt the work and eventually to develop into a district school.

Q. Do you know of this peripatetic system in the United Provinces?—A. I have not connection with the United Provinces at all, but the teachers-in-charge of the weaving schools there have been recruited from my institution.

Q. Do you get the report of the Director of Industries of the United Provinces?—A. I don't.

Q. You say in regard to co-operative credit, that the laws and rules of co-operative credit societies require modification. Could you give any examples?—A. For instance the weavers of Bengal are accustomed to a certain system of obtaining their raw material on credit and of borrowing money, which has been brought into practice by these mahajans, and now if co-operative societies could follow on those lines, and become benevolent mahajans, I think the weavers would more readily accept the ideas of co-operation as these methods suit them. Further the mahajans take over the woven cloths from the weavers, whereas the co-operative societies do not, with the result that the weaver is expected to do his own buying and selling which he is incapable of doing.

Q. That is true all over India and that is one of the reasons why co-operative credit was started. That does not seem a reason for modifying the co-operative rules but for changing the attitude of the weavers?—A. In Bengal, for instance, take the weaver's societies. I do not know if there are any special rules suitable for weavers. The authorities simply give the money to the weavers and it is very difficult to recover it from them. This is all what the co-operative societies have hitherto done, and under these circumstances no artisans could be induced to sever his connection with his mahajans although they are at times very hard on them.

Q. You suggest the desirability of Government guarantees to the higher forms of co-operative banks. Are you aware that this has proved unnecessary in any other part of India except Bombay?—A. I do not know. But Government guarantees will undoubtedly attract larger capital.

Q. You have a provincial bank in Bengal. It has not got a Government guarantee?—A. No. It has not.

Q. What is your reason for suggesting that. Do not they get enough money?—A. I have often discussed this matter with capitalists and I find that they seem to think that their money is not quite safe, while on the other hand if they got some guarantee from Government more capital would be invested in these banks.

Q. There is a certain amount of outside supervision exercised at present. Don't the people attach much value to it?—A. They do attach some value but the facts that these banks have not attracted more capital from local men shows a lack of confidence.

Q. What do you do outside your school?—A. I have got five district weaving schools and some technical and industrial schools which I have to inspect twice a year. I have also to inspect some mission weaving schools, such as the industrial section of the Kalimpong Homes.

Q. Do you get any opportunity to see what your ex-students are doing?—A. Yes, I do occasionally as I inform them beforehand when I visit a station. The students come to see me and inform me in case they have any difficulties, as the time would not permit of my going to the villages to see what they are doing. The teachers of the district schools are also in touch with their men, as when the students from the district schools bring their products to the local markets, they also pay a visit to the schools.

Q. Do the masters of the weaving schools try to keep themselves in touch with the students of the outlying parts?—A. They do, as far as it is possible.

Q. Do you know how these students are generally doing?—A. As far as the artisan are classes concerned we have no trouble as after they have finished their course of instruction at the schools they are able to earn a rupee or two more than they did before.

Q. How do they manage to get hold of these improved looms?—A. At these various district board schools we have raised funds by subscriptions for the purpose, but they are not very large. We have obtained these funds by local subscriptions and we advance them rupees five or ten for the purchase of a slay and recover the money in easy instalments. Recently Government has also sanctioned a scheme for this purpose but it has not been brought into force yet.

Q. Are they being taught on one kind of loom?—A. No, there are different kinds of looms at the schools and they choose the one they like best, and what they think will suit them.

Q. Do they themselves select?—A. They know their requirements better than the teachers, and when they take a fancy to a particular kind of loom, it is very difficult to convince them to the contrary.

Q. Has it been necessary to provide a market for what the weavers have made?—A. Not always, but the lack of a steady market is a great drawback in the cases of most of these weavers. They live a hand to mouth existence and, as a rule, sell all their cloths to the mahajans, who keep them in their grip.

Q. Do they turn out better cloth with the improved loom?—A. They do, and as far as the production is concerned a larger output. They also turn out a better class of material, with fancy designs which assist them to sell their stuff better, and more easily.

Q. You never had any idea of an organisation for placing them in touch with the market?—A. The subject has been brought up, but nothing has been done so far.

Q. Has any use been made of the commercial museum in this respect?—A. No.

Q. There is a commercial museum here, which stocks a number of articles made by industries in this country, and they try as far as possible to advertise the fact among people who are likely purchasers?—A. As far as the artisan classes are concerned they have no opportunities of going to the commercial museum and possibly they would find great difficulty in approaching the authorities of the museum, I think that it will be far better to have small museums in each district headquarters station. The products, natural and manufactured, should be exhibited at these little commercial museums, and alongside of them imported articles for which there is a sale should be exhibited.

Q. These articles are purchased by people from outside Bengal who come once a year?—A. They come sometimes about two or three times a year. In some districts they come only once.

Q. Do the mahajans export?—A. I do not know whether they export. But I know they dispose of the goods, they buy from the weavers and sell them possibly at Calcutta.

Q. Take the case of Tangail in the Mymensingh district. What sort of loom do the weavers use?—A. It is the ordinary indigeneous loom, the same kind of loom that is used generally throughout Bengal. At the school the students are instructed to use some two or three kinds of fly shuttle looms.

Q. Have these men obtained employment other than as instructors and so on?—A. A few of them have found employment in the mills, others in commercial houses, and some as weaving instructors.

Q. None of these students tried their hands as weavers?—A. All the artisan students work as weavers at their homes or in factories, but as far as the higher class students go they naturally aim higher and prefer lucrative employment.

Q. You speak of industrial surveys. Do you know any case where any practical action has been taken as a result of an industrial survey?—A. Yes, as an example I may mention Bihar and Assam. The authorities after my survey of these provinces have accepted my proposals to some extent, which have resulted favourably in some quarters.

Q. You have some remarks about the usefulness or otherwise of exhibitions? What instances have you had personal experience of?—A. Yes, a few years ago exhibitions were organised in Bihar and Orissa where we were always asked to demonstrate improved methods of weaving as well as improved machinery.

Q. Were you in a position to sell any looms?—A. We offered to put enquirers in touch with the sellers. We never actually sold.

Q. Do you know if any sales were effected?—A. On my return to headquarters I received several enquiries but whether they resulted in business or not I cannot say.

Q. Bihar and Orissa had no means of providing demonstration in the use of such looms?—A. Yes, we had weaving schools established there, before the reconstitution of this province.

Q. Who is in charge of these schools?—A. At present the schools in Bihar and Orissa are under the Registrar of Co-operative Societies.

Q. Did you see the Allahabad exhibition?—A. No.

Q. What is your opinion about the view that exhibitions are not of much use unless you have got at the same time an organisation to demonstrate locally?—A. These exhibitions would be very good if they were properly managed and if the leading people of the districts could be

made responsible for the sale of suitable machinery to the ryots over whom they generally have influence.

Q. What do you mean?—A. There are generally a number of zamindars and other local gentlemen who have a lot to do with these exhibitions, if the district officer made them responsible to some extent to induce purchases among their friends and the ryots; these exhibitions would be very useful.

Q. We have had before us evidence to show that there are very many industrial schools in Bengal, and that if all these were put under a Director of Industries it looks very much as if he would not be able to do anything but inspect them. Do you know anything about the position of such schools in Bihar and Orissa?—A. Yes, as far as the Bihar and Orissa schools are concerned they are not so numerous. There is no expert authority to supervise them at present except the Registrar of Co-operative Societies who goes round to inspect them sometimes. The technical schools are supervised by the Principal of the Bihar School of Engineering.

Q. Do you think that it would be possible for the Director of Industries in Bengal to attend to the ordinary work, and at the same time inspect the various schools and control the expert staff?—A. Yes, I think so, but he must have proper staff of at least two or three expert inspectors to assist him.

Q. You would have men for inspection work doing inspection and nothing else?—A. Yes, I think the inspecting officers should not be burdened with too much office work, most of their time should be devoted to inspection work, and to promoting industries which are on the decline. What I mean is that the inspecting officers should be given more time to attend to their legitimate duties rather than to be confined to their offices, for the want of a competent office staff.

Q. Do you not think that you unduly cripple the expert when you draw him away from his legitimate work. Do you think he could be entrusted with the work of inspection?—A. Yes, if the work was not too much for him, that might be done.

Q. We might have the distribution on territorial lines?—A. Possibly that may do. In my case I cannot go into the villages, as I can spare very little time for such inspections besides my other duties of lecturing, etc.

Q. Do you think it would be the best plan to have the more responsible officer to do the outside work?—A. Yes, but who will do the office work then, which requires expert knowledge also.

Q. A very inferior type of man could do that?—A. I do not think so as many intricate problems constantly arise which require expert knowledge to solve.

Q. That requires merely theoretical knowledge which many men possess. But for administration and for demonstration you want a higher paid officer?—A. It may be so to some extent.

Q. Can you think of any industries which the Director of Industries might concentrate his attention on?—A. In Bengal hand loom weaving plays an important part. The tanning of hides, oil pressing, rice hulling and also sugar manufacturing have a great future in this province and these industries should be encouraged and more efficiently worked.

Hon'ble Pandit M. M. Malaviya.—Q. Where were you employed before?—A. I was last employed by Messrs. Greaves Cotton and Co, and I came out for them on a three years agreement.

Q. What was the nature of the work for which you were engaged?—A. It was chiefly commercial work, such as the selling of engines and boilers, etc., and estimating for various extensions connected with mills.

Q. Had you any previous connection with the weaving industry? A. Yes, I have been through a regular course in the mills. I rose to the positions of carding and spinning master and manager in the cotton mills. I have also long been connected with the weaving industry.

Q. You say that India once held a commanding position in the industrial world, and that she has now lost it owing to the apathy and conservatism of her people. Do you seriously think that it is due to the apathy and conservatism of the people that the industries of India were lost?—A. Yes, I think so. The chief reason being that it is very difficult to get the people to adapt themselves to new conditions or to make them accept any improvements, although they may be perfectly convinced of their superiority. In the case of the fly shuttle looms for instance it has been very difficult to get the weavers to adopt them, inspite of their being convinced that these looms are far superior to the primitive looms used by them.

Q. You say that the Indian artisan is more than a century behind time in his methods?—A. Even longer than that.

Q. Are you aware that Indian manufactures excelled those of Europe a hundred years ago?—A. I accept that, but as soon as the fly shuttle loom was introduced in Europe about 150 years ago her downfall began.

Q. Are you aware that it was stated in evidence (in 1813) before a Committee of Parliament which enquired in to the matter that the cotton and silk goods of India up to the period could be sold for a profit in the British market at a price from 50 to 60 per cent. lower than those manufactured in England, and that it therefore became necessary to protect,

the latter by duties of 70 and 80 per cent. on their value or by positive prohibition of Indian manufacture. It is not therefore correct to say that India lost her industries because of the apathy and conservatism of her people?—*A.* That may be correct to a certain extent but the fact remains that since she did not adopt modern machinery and developments she lost her foreign markets as well as her home markets.

Q. Do you also know that the market for Indian goods was also very much restricted during that time by the action of the English Parliament?—*A.* I do not know to what extent your statements are correct as I have never before heard such reasons given accounting for the decline of Indian industries.

Q. England with a view to develop her own manufactures passed a Shipping Act which prohibited the goods of India from being imported into England, except in ships belonging to English subjects. In that way the market for Indian goods in England was restricted. Do you now see that the decay of Indian industries was due more to the action of the English Parliament than to the apathy and conservatism of the people?—*A.* I think it was not entirely due to that, as when the Indian manufacturers found that there was a duty imposed they should have improved their machinery, as other European countries did, and they would then have been able to face competition. Besides this there seems to be no reason why the Indian artisans should have lost their home markets when in India there are no less than 30 crores of people.

Q. But the methods and conditions of manufacture have changed and while much has been done to promote the cultivation of cotton, little has been done to encourage the manufacture of cotton in this country on modern lines. Do you think that is also entirely due to the apathy of the Indian?—*A.* Yes, I think so to a great extent.

Q. Do you find that people are still unwilling to improve their methods?—*A.* It is not only my experience as a promoter of industries but it is also the experience of the Agricultural Department and these conditions will exist, so long as the leading people of the country don't meet Government half way, and assist in improving present conditions.

Q. You advocate a system of instruction by means of peripatetic schools. Don't you think that to meet the large demand for trained artisans, you should have industrial and technical district schools also and not rely on peripatetic schools alone?—*A.* From my written evidence you will see that I have suggested that both should exist side by side. First of all the machinery should be introduced among the artisans through the medium of peripatetic instructors, and when there is a demand for industrial and technical instruction, and more advanced education, technical and industrial schools should follow.

Q. You say that it will be necessary for the Indian artisans to rouse himself to greater efforts in industrial improvements by removing the obstacles which have led to the decline of Indian handicrafts. Do you mean that the means for removing this is the spread of technical and industrial education?—*A.* In addition to that, the adoption of improved machinery.

Q. And the financing of industries by means of co-operative societies?—*A.* Yes.

Q. Could you give us the number of hand loom weavers in Bengal?—*A.* About 8 to 12 lakhs.

Q. You think that with improved machinery, with improved hand looms and a little demonstration in the way in which you have suggested, the hand loom industry has a future before it?—*A.* Yes, especially if developed as a cottage industry.

Q. Suppose it is worked in small factories?—*A.* The factories may exist along side with cottage industries since many of the artisans are also partly cultivators.

Q. Don't you think that the power loom will kill the hand loom?—*A.* That is a very difficult thing to answer. The hand looms exist still in Europe. I think they have got their own particular duties to perform.

Q. Does not the hand loom fabric wear longer and is not the extra cost incurred in buying a hand loom cloth more than made up for by its comparatively greater durability?—*A.* I think so. People prefer to buy hand loom made goods rather than the power loom made goods. In the majority of cases, however, people prefer to buy something cheap.

Q. You speak of a scheme for the revival of industries. Has it not yet taken shape?—*A.* Yes, the scheme for the revival of the hand loom weaving industry of Bengal was sanctioned in 1907. The scheme provides a central institution and five district schools. These schools with the central institution are supposed to afford instruction to the weavers of the districts where they have been established.

Q. And do you find that people are coming to take advantage of these schools?—*A.* The schools are full and artisans are readily attracted to them now although we had a lot of up hill work in the beginning.

Q. You think that this scheme will be an effective method of instructing the masses. But would they not appreciate the instruction better if they had a little general education?—*A.* No; as all the schools combined do not turn out more than about 200 students a year and this number of 200 is nothing as compared with the masses of the people. If, on the other hand, these district schools were combined with peripatetic village schools the work would be accomplished much quicker, and a little general education would no doubt tend to make the

artisans appreciate the instructions and they would possibly take to improved methods more readily.

Q. You want better means of instructing the masses?—A. Quite so, more effective means at least.

Q. With reference to the training of apprentices, do you think that night schools will be sufficient?—A. Yes, we have got night schools. The apprentices attend the shops in the day and take advantage of the night schools. It might be given a longer trial. I cannot say whether the people will take to it or not.

Q. You suggest that the Director of Industries should have three experts to assist him. What class of men would they be?—A. They should be officers who possess an expert knowledge of the industry or industries they have been called on to promote.

Q. Do you think three men will suffice for a province like Bengal?—A. I think they must have competent staffs under them, otherwise it would be impossible to get along and to cope with the work thoroughly.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. How many years have you been in this post?—A. From the latter end of 1908.

Q. How many schools have you got under you?—A. One central institute and five district schools, besides some technical and mission Industrial schools.

Q. Have you got anything to do with the Salvation Army people?—A. No I have to supervise a section of the Kalimpong Homes, and other industrial schools run by missionaries.

Q. How much are these students able to get after they leave the school?—A. At Serampore I have got two types of men, viz., of the middle classes, and also the actual artisans. The middle class men earn anything from 30 to Rs. 200 per mensem whereas the artisans earn from Rs. 10 to Rs. 20 per month.

Q. Where are they employed?—A. All over India. Some are employed in mills, some as teachers, etc.

Q. Where do they get the yarns? Do you think that the industry is falling only through want of capital?—A. They buy their yarns from yarn merchants at Calcutta. The main causes of the decline of the industry are—(a) The want of sufficient capital, (b) the want of a market. Most of the artisans are in the hands of mahajans who supply them with yarn and take back their woven products allowing them just sufficient money to live. The earnings of a weaver may be reckoned at anything from Rs. 8 to Rs. 20 per mensem.

Q. If there are co-operative societies and if they finance the weavers, don't you think that would help?—A. Yes. Co-operative societies, if managed properly, would assist considerably in replacing the mahajans, but difficulties will arise in the co-operative societies finding markets for the sale of the woven goods of its members.

Q. They can have the co-operative stores where they can sell their goods, especially in big places like Calcutta or Dacca or Mymensingh?—A. Yes. I suppose a certain amount of their goods can be disposed of in that way, but there is no organisation for this purpose.

Q. Are there any dyeing classes?—A. Dyeing classes were attached to the Sibpur Engineering College but they have been discontinued from this year as there were no students.

Q. Do you think there is any possibility for the cotton industry here?—A. Yes. There are three or four mills here.

Q. Where is the cotton?—A. We obtain cotton from Bengal and Assam, and for the finer counts from the Central Provinces and Berar.

Q. Is that good enough?—A. For the manufacture of coarse yarns they use this cotton and for the finer yarns they get the cotton from Central Provinces and from the Bombay Presidency.

Q. Don't you think that it is rather costly to get it from long distances. Do you think they can effectively compete with the mills on the other side of India?—A. I think there is a good chance of the mill industry succeeding. In fact some of the Bengal mills are succeeding quite well.

Q. Do they make coarse cloths?—A. The Bengal mills chiefly manufacture fabrics with medium yarns, spun with local cotton and fine fabrics with imported yarns, that is yarns 40's counts and upwards. The coarser yarns are exported or used up locally by the hand loom weavers.

Q. You have got only 200 students?—A. No; I have at present about 100 students in my Central Institution, and on an average of about 200 at the district schools.

Q. Do they get employment easily?—A. I think we have been very successful so far.

Witness here gave confidential evidence.

Mr. A. Chatterton.—Q. As you probably know I have taken some interest in hand loom weaving questions and I shall ask you some questions in detail with a view to get your experiences in these matters. When you first joined the Bengal Educational Service were you informed by the Director of Public Instruction as to any particular policy that you were to carry out?—A. No; I do not think so.

Q. What instructions did you get from Government when you first joined the Educational Department? What were the lines laid down?—A. I was told that I was expected to open a Central Weaving Institute at Serampore and five weaving schools in the most important centres of the hand loom weaving industry. The proposals of the committee appointed by the Government for the revival of the hand loom weaving industry of Bengal which are contained in the Government letter No. 901-T. G., dated 8th June 1904, were given me and I was asked to work out a scheme on the lines indicated in the letter and to open the schools with as little delay as possible. On my arrival in India an assistant principal, a clerk and a drawing master were appointed to assist me and with these officers the Central Institute at Serampore was opened in about a month's time after I took charge. A reference to the letter and the correspondence thereon will show that it merely gave the outlines of the scheme of work, the budget grant and the staff I would get. This scheme of work has since then been modified considerably to suit conditions and to make it workable.

Q. Did you consider it necessary to study the economics of hand loom weaving in Bengal?—A. The original idea was that I should tour through Bengal, but I never had an opportunity of doing so. I was put on starting the weaving institution straight away.

Q. That is to say that you had to neglect the economic side of the question at the outset in favour of the development of the school on its technical side?—A. I had to start the school under instructions and that was my duty. The economic conditions and possible success were probably studied by the committee before it was decided to open a school at Serampore.

Q. In the course of your experience have you come to any conclusion as to whether the lines on which you have been working are satisfactory?—A. The conclusion I have come to is that the industry has a chance of success and that if the fly shuttle loom is introduced amongst the villagers better results may be expected.

Q. But to bring about this result do you consider that the weaving school at Serampore is an essential item in the programme?—A. I think a central institution is very necessary, otherwise it would not be possible to train the middle classes, and also to instruct the more enterprising weavers who would be anxious to receive further training.

Q. Do you consider it necessary to train the middle classes in the Serampore Weaving Institute?—A. I think it is absolutely necessary, as the middle class men may be considered as a link between the artisan and the capitalists.

Q. What is going to be their future?—A. We have been quite fortunate so far as from 80 to 90 per cent. of our boys have been successful in obtaining employment.

Q. In what way?—A. As teachers in factories, mills and as officers-in-charge of the textile departments in Jails.

Q. They are all pursuing the textile trade in some form or other?—A. There may be some instances here and there in which they are not doing so, but generally speaking they are all employed connected with the textile industry.

Q. What would be the percentage of teachers?—A. I just forget, but it may be taken at 25 to 30 per cent.

Q. This is an artificial demand?—A. No; hitherto the demand has been practically constant. For example zamindars constantly want men to train the people in their villages.

Q. You told us that they were averse to doing so?—A. Generally speaking they are averse to doing so but if we can get the leading people in the districts to influence them they readily take the advice and adopt improved methods.

Q. Were those weavers in a better economic position than the weavers in other districts of Bengal where they are using the ordinary pit loom?—A. Yes.

Q. When the advantages of using the fly shuttle loom are so obvious they still won't take up to the fly shuttle loom?—A. No, as they are generally conservative and will not adopt anything new unless influenced by their leaders.

Q. Is there any economic reason why the weavers in the Hooghly district should adopt the fly shuttle loom?—A. It was introduced by the Danes and certain amount of compulsion was brought to bear on them.

Q. My information is that it was introduced into 4 or 5 districts and then it spread voluntarily. Obviously the Danes must have had very little influence beyond Serampore?—A. Yes, the information you have received is correct as the fly shuttle loom is believed to have been introduced first at Serampore and when it proved a success some of the villages also adopted it. In some districts like Bankura they are also used to a certain extent which is due to the Swadesi movement of 1907.

Q. Have you been able to form any idea as to why in certain parts of the country fly shuttle looms are found and that in other parts they will take to them only under compulsion?—A. I think this is due entirely to the zamindars and other influential gentlemen who have introduced the looms and their influence over their subjects.

Q. You think there is no other reason?—A. I think that is the only reason.

Q. Do you think that it is due to economic reasons?—A. Not, so far as I am aware, in the case of Bengal.

Q. Can you tell me what you think would be the necessary working capital for a young man to start a small fly shuttle loom factory, a hand loom factory with, say, ten looms?—
A. Much will depend upon the markets he gets. In Serampore the weavers sell their stuffs only once a year, whereas in other places where there is a constant demand for the cloths a much smaller capital will be needed. The machinery will cost about Rs. 400.

Q. Can you work out in detail what would be the cost of two or three typical factories such as you think could be started here with the prospect of running it successfully, and send it to the Secretary to the Commission?—A. Yes. I could do that.

Witness subsequently forwarded the following statement:

Estimates of the annual cost of installing and working Hand Loom Factories.

1	2		3				4	5			6	7	8
No. of looms.	LOOMS.		PREPARATORY MACHINERY.				Accessories cost.	RECURRING CHARGES PER ANNUM.			Reserve capital.	Working Capital total columns 5 and 6.	REMARKS.
	Type.	Cost.	Winding.	Warping.	Pirning.	Cost.		Wages.	Materials.	Contingencies.			
		Rs.				Rs.	Rs.	Rs.	Rs.	Rs.	Rs.		
10	Serampore Flyshuttle looms.	350	2	1	3	46	162	2,580	3,800	60	3,220	9,660	The particulars have been calculated on the understanding that the factory will be able to dispose of its goods twice annually and also that the working capital will be sufficient for 18 months. The initial cost of the machinery has not been included in column 7.
20	Ditto.	700	4	1	6	57	310	4,536	7,600	120	6,128	18,384	
30	Ditto.	1,050	6	2	10	105	471	7,128	14,400	180	10,854	32,562	
50	Ditto.	1,750	10	2	16	127	765	11,520	19,000	300	15,410	46,230	

Q. You say that at the present time there are several weaving factories which are working successfully. Can you tell me where these factories are?—A. You mean in Bengal.

Q. Anywhere?—A. My students have started hand loom weaving factories in Nepal, at Kasimabazar, at Gomo, at Madras, at Colombo and in several other places in Bengal.

Q. Have you got any accounts of their financial position. Are they working at a profit?—A. I do not know. I get letters from them and they frequently write to inform me that they are doing well. As far as the Nepal factory is concerned it was started by the Raja.

Q. He can afford to lose money. You say that in some parts of Europe hand loom factories have been found to be a success?—A. Yes, in Ireland and France and in most silk growing countries.

Q. Where in Ireland?—A. I do not know exactly the names of the places where the factories are, but several hand loom factories are working in connection with linen trade.

Q. Have you actually seen them or is it only second-hand information?—A. I have not actually seen them but a reference to the official reports on these subjects should be sufficiently convincing.

Q. What improved processes have you demonstrated in the course of your teaching in the school?—A. The primary improvement was the introduction of the fly shuttle loom and the second are the making of warps, sizing, and the introduction of dobbies and jacquards.

Q. Have you any special arrangement for sizing at Serampore?—A. Yes, we do hand sizing and mill warping.

Q. About the difference between the hand woven cloth and the mill woven cloth in respect of durability, what do you attribute the durability to?—A. The cloth seems to lose strength in the process of calendaring.

Q. If you omitted that in the mills?—A. The strength would be practically the same then.

Q. Do you think hand sizing has anything to do with the matter?—A. As far as the size is concerned in both cases the size washes out.

Q. After the cloth is woven?—A. Yes.

Q. Don't you think that the fibres of the yarn are better set by hand sizing?—A. Yes, but the sizing in the mills is also very good.

Q. In the course of your tours did you go to Dacca?—A. I did not go there as I have no school at that station.

Q. Do you know anything about the weaving at Dacca?—A. I have not had an opportunity of going there. The orders I have received are to go only to certain schools. I cannot wander about all over the province.

Q. You say that although you have not been directly concerned in the raising of capital you have started a number of small factories for ginning cotton and so on. Were these under Government auspices?—A. They were more or less commercial enterprises and run by private capitalists.

Q. You have no system here of giving weavers takavi loans or of supplying looms on the hire purchase system?—A. In the district schools we have a small local fund for the purpose of supplying looms to passed students and recently Government has sanctioned a sum of money for it. But the scheme has not come into force as yet.

Q. How do you propose to finance them?—A. On the completion of the students' training we give him sufficient capital to purchase a loom. He signs a bond and later we recover the money from him as prescribed by the Government rules.

Q. It is a kind of hire purchase?—A. It practically amounts to that.

Q. You say that as regards Government pioneering industries you would introduce modern machinery through the medium of co-operative societies or rural banks. Have you got any scheme by which this could be carried out?—A. Yes, as far as the cottage industries are concerned.

Q. How do you propose to do it through the agency of co-operative societies?—A. The co-operative societies should be called on to provide the members of their societies with sufficient capital to purchase improved looms, etc., and these societies should also arrange to take over the cloths woven by the members, should the members be unable to sell the products of their looms themselves then the society should endeavour to sell the goods by contract either to the local mahajans or to the merchants at Calcutta. This experiment has been tried by one or two co-operative societies in Bihar and the results have been satisfactory.

Q. Have you got any actual examples of the co-operative society furnishing the members with improved machinery?—A. Yes, one or two co-operative societies are working on these lines, viz., the Ranchi Union, The Sakona Society of Bihar Kutchari. The Sambalpur Silk Weaver's Society.

Q. Inside Bengal?—A. Such societies are very few, infact I do not know anything about them.

Q. As far as industries in Bengal are concerned the co-operative movement has not spread to the necessary extent?—A. No. Not as far as industries are concerned, but there are many agricultural societies.

Q. You say that these central and rural banks could be considerably improved if placed on a safer footing by Government? What do you mean by that?—A. The capitalists are at present unwilling to put in their money in the various banks and the money would come in readily if there was some sort of Government guarantee.

Q. You want a Government guarantee?—A. That is what they look to.

Q. You say that many industrial co-operative societies were started but they were not successful. What organisation would you provide for the supervision of these?—A. There ought to be expert inspectors to go round and help the weavers to purchase their yarns economically, to sell their woven products, to check their accounts and to keep them always in working order. Those conditions do not exist here.

Q. Have you had any direct connection with a co-operative society?—A. There is a society at Serampore. That was started by the local weavers. I tried to help them to a certain extent, but the Registrar took the matter out of my hands, and he is now working it himself. He has got his own men to look after the matter and therefore there is no necessity for me to interfere.

Q. Is the Serampore society working satisfactorily?—A. I do not think so.

Q. Would it not have been an interesting experiment for you to have got control over these weaving societies?—A. It was with that very reason that I took the matter up. My convictions are that the Superintendent of Industries should have the control and management of all such industrial societies and he should be made a Joint Registrar.

Q. Have you addressed the Registrar of Co-operative Societies in the matter?—A. He knows my views about it. I have written to him several times.

Q. With what result?—A. He has asked me to take up the management of the Serampore society again.

Q. What do you mean by decaying industry? Do you consider weaving a decaying industry?—A. No, not weaving generally speaking, but the hand loom weaving industry of India. By the word "decaying" I mean an industry which is on the decline.

Q. Are there available statistics in Bengal sufficient to enable you to form any opinion as to whether hand loom weaving is making progress or not?—A. I do not know of any such records being kept in Bengal.

Q. Have you ever looked at the economic side of the question?—A. Yes. The prospects seem favourable as far as hand loom weaving is concerned.

Q. Do you know how much yarn is used by the hand loom weavers in the province?—A. Not exactly, but we get a vague idea from the textile journals.

Q. Have you seen the statistics which have been published in regard to other provinces which tend to prove that the output of the hand loom weavers is on the increase?—A. No.

Q. You say that the district schools have been well attended. I presume that is due to the fact that you give scholarships?—A. I do not think so. The amount is only Rs. 4 a month per scholar. Most of the men are adults. The amount of money that is offered is no attraction to them.

Q. In these factories which have been started by the pupils of the Serampore School besides fly shuttle appliances what other appliances of an improved type have you got?—A. Mill warping, pirning, winding and many other improved appliances have been introduced.

Q. Have they taken to dobbies or jacquards?—A. Yes, some of the weavers have taken to dobby and jacquard weaving and we are now endeavouring to spread the use of them in all districts where dhoty and saree weaving is done.

Q. Are there many in use here?—A. Not many. I could not give you the exact number.

Q. You have some in the school?—A. Yes.

Q. What is your experience of the Hattersley loom with the artisan class?—A. The artisan classes take to these looms very readily but unfortunately they cannot afford to buy them. Some of the more well-to-do men have purchased them.

Q. Apart from the question of cost have you found that it is too heavy?—A. Yes, they find it a little heavy, but with practice they can work at it the whole day without getting exhausted.

Q. You have already mentioned that the great difficulty about the development of the hand loom trade is the question of finding a market. Could you not devote a considerable amount of attention to this particular aspect of the question in the future?—A. Certainly I could, but my present duties will not allow of my doing so.

Q. The imported piece goods trade amounts to many crores a year and there is no difficulty in selling the whole of this through the organised agencies which have been established in the country. What real difficulty is there in creating a similar organisation to deal with the hand woven goods?—A. Hand woven goods have got only a local market and some how or other the industry does not seem to have been centralised, but there seems to be no reason why the local-made goods should not be sold if there was a proper organisation.

Q. If prominent attention were directed to this aspect of the question it is possible that mercantile people might find it possible to take it up. Have you any idea of the output of the 400 thousand looms of Bengal?—A. No, but the value of the goods may be calculated at Rs. 10 to 15 a loom per month.

Q. Then you have an unorganised trade of 7 to 8 crores a year. Would it not be worthwhile to take steps to get it properly organised?—A. Certainly.

Q. Is the whole of this trade a seasonal one or is there a steady demand?—A. Yes, it is more or less a seasonal trade. In some districts however there are biannual and triannual markets, whereas in other places, the weavers sell their cloths at the weekly markets. At Serampore the mahajans place their orders for the whole year with the weavers and recover the woven material from them just before Puja time. The cloths are then washed, finished and supplied to the merchants at Calcutta with whom they have steady contracts for the supply of hand-loom-made sarees, dhoties, and gamachas. The prices of these woven articles are just a little more costly than mill-made goods as the latter are manufactured on a large scale and the weavers find employment throughout the year from the merchants. The merchants also are consequently able to buy their yarns at wholesale rates.

Q. To what extent do individual mahajans deal in this business on a big scale?—A. At Serampore we have mahajans who have got as many as hundred looms each under their control. The weavers who work these looms make a contract with them for a yearly supply of some hundreds of pairs of dhoties and sarees. The weavers are not required to invest their capital at all but limit themselves to the manufacture of the cloths.

Q. Has any attempt been made to get the mahajan to improve the output? What is his attitude?—A. He is a very suspicious person and does not interest himself in any way with improving the machinery or output of the looms as the looms are not his property and the prices at which he manufactures his cloths are quite satisfactory.

Q. Have any of these people taken any interest in the improvement of the production?—A. No, none of the local gentlemen have hitherto made an attempt to improve the production of the Serampore looms but I believe that during the Swadeshi movement some of them came forward to help the weavers.

Q. You say that you are using jacquard looms in the Serampore school. Have any of these been introduced in the districts?—A. There are a few in Bankura and a dobby and a jacquard have recently been purchased by the municipality for the benefit of the Santipur weavers.

Q. Where do they get their cards from?—A. From England in the first instance and afterwards they buy their cards from the local shops in Calcutta.

Q. Where do they get them cut?—A. They cut it themselves.

Q. Have you got a card cutter in your factory?—A. No. We cut out cards with hand punches.

Q. Are they using the drawboy type of harness?—A. At Bankura you will see both types—the jacquard and the drawboy.

Q. Have you shown the relative advantages of the two? Have you compared the rate of working?—A. It is not easy to do that in an institution like that of mine, but it has been tested in the various villages. For instance at Bankura where the jacquard has been introduced, it gives about three to four times as much work.

Q. And yet it is difficult to get them to adopt the improved methods?—A. Yes, as the Indian weaver is very conservative.

Q. Could you arrange to sell jacquards on the hire purchase system?—A. We could, but there is no money available for that purpose.

Q. Have you ever applied to Government for funds?—A. I said that a scheme has been sanctioned for the purpose of advancing loans to the students who pass out of the institution and the same money could be used for that purpose.

Q. In regard to the Serampore School can you send us the last annual report?—A. Yes.

Q. What is the annual cost of upkeep?—A. About Rs. 28,000 for the Central Institute and its outlying centres.

Q. What do you do with the products of the looms?—A. We do not sell them. The boys bring their own yarns and when they have woven the material they sell it in the local markets.

Q. There is no commercial side?—A. No, that is one of the reasons why the men come. This system of work has proved an attraction as the weavers are permitted to canvass orders in the market and to sell their material after defraying the cost of the yarn.

Q. How much was the capital outlay on the institute?—A. For the purchase of the machinery and furniture the initial capital was Rs. 6,000.

Q. How much has been spent since?—A. Very little.

Q. All your equipment cost only Rs. 6,000?—A. Yes, that is all.

Q. You speak of your deputation to other provinces?—A. I was deputed to Assam and Bihar and Orissa twice for inspection work and also to report on certain matters that interested the Government there. I was sent also to the Indore State last year.

Q. In answer to question 55 you say that all those in charge of prime movers should possess Government certificates of competency? Is that statement based on practical experience?—A. Yes. I think it very necessary as unless these men are of a certain standard the general tendency of the employers is to procure cheaply paid men who are as a rule incompetent, and there is always a danger of their doing damage. It is necessary that there should be some Government control.

Q. Would you have Government control to prevent your servants from breaking your crockery?—A. That is quite a different matter.

Q. Why should not a private individual be allowed to employ whom he pleases to damage his own machinery?—A. The public are also concerned. If a boiler bursts for instance there is danger to life.

Q. In the case of small prime movers don't you think it would be a great handicap to their owners if you insist on the employment of drivers with Government certificates?—A. On the other hand it is a great safeguard, but an exception could be made with small prime movers, such as oil engines, etc.

Q. Do you want a certificated man in the case of small pumps and engines?—A. No, in such a case a third class driver would do if he understood the working of an oil engine.

Q. On what pay?—A. It depends on the place. In some places they get 60 or 70 rupees per mensem. In other places only 20.

Q. In Madras there are hundreds of drivers on very small pay in some instances as low as Rs. 7?—A. They are simply coolies, and the owners of the plants invariably realise that economy of this nature is really no economy in the long run.

Q. Do you know whether in England people in charge of prime movers have to be certificated?—A. The conditions are different there. Such men cannot become engineers all at once. The proprietors would not allow him to take charge of the factory unless they were convinced that he was thoroughly reliable and experienced.

Q. In your experience how many machines have been damaged by these men?—A. I know of four or five instances, but I could not tell you exactly the number of such cases. I have had a lot to do with the selling of machinery in the Central Provinces, Madras and a portion of the Punjab.

Q. Would you apply the same regulation to an oil engine for instance?—A. Oil engines are excluded as with these prime movers there is not the same danger of explosions as in the case of boilers.

Q. Would you eliminate the oil engine?—A. Yes.

List of Hand Loom weaving factories opened by ex-students of the Serampore Weaving Institute forwarded by Mr. Hoogerwerf, after oral examination.

Serial No.	Names.	Address.	No. of Looms.	REMARKS.
1	Nalin Behary Nandy.	Sahagunj, Hoogly.	1 Hattersley's and 3 Fly Shuttle Looms.	He closed his factory after working it for about a year and a half as he found that he had not sufficient working capital. The cloths turned out in his factory were quite good and commanded a fair sale.
2	Nirmal Chandra Mukherjee.	Eroali, Murshidabad.	5 Hattersley's Looms and preparatory machinery.	This factory is financed by the Maharaja of Kasimbazar. He is weaving silk cloths for which he has a sale at Calcutta.
3	Srinibas Saha.	Bhadreswar, Hoogly.	6 Looms.	He closed his factory after working about a year as some dispute arose among the share-holders.
4	Bijoy Krishna Mukherjee.	C/o Brothers Partners, 10, Sukea's Lane, Calcutta.	6 Looms.	He closed his factory for want of funds after working for about 2 years at Gomoh.
5	Debendra Nath Lahiri.	C/o Station Master, Coomerkhaly, E. B. Ry.	4 Looms.	He has just opened his factory.
6	Haripada Hans.	Post Office and Village Badanganj, Hoogly.	3 Looms.	He has installed three looms at Badanganj with his own capital and sells the products of his looms to the local merchants. He is believed to be doing quite well.
7	Atal Behary Nandy.	Post Office and Village Badanganj, Hoogly.	4 Looms.	He has installed three looms at Badanganj with his own capital and sells the products of his looms to the local merchants. He is believed to be doing quite well.
8	Hem Chandra Dalal.	Post Office and Village Badanganj, Hoogly.	2 Looms.	He has installed three looms at Badanganj with his own capital and sells the products of his looms to the local merchants. He is believed to be doing quite well.
9	Manick Chandra Nandy.	Post Office and Village Badanganj, Hoogly.	3 Looms.	He has installed three looms at Badanganj with his own capital and sells the products of his looms to the local merchants. He is believed to be doing quite well.
10	Bhusan Chandra Das.	Post Office and Village Kayapat, Hoogly.	3 Looms.	He has installed three looms at Badanganj with his own capital and sells the products of his looms to the local merchants. He is believed to be doing quite well.
11	Moti Lal Laha.	Lal Bagan, Chander-nagore.	2 Looms.	He closed his factory after working a few months and went to Nepal where he is running the State Hand Loom Factory quite creditably.
12	Kenaram Mahapatra.	Village Belda, Post Office Potashpur, District Midnapore.	5 Looms.	He has opened a factory with 5 looms but no information is to hand as to what success he has met with.
13	Kishory Mohan Taldi.	Village Makulpore, Balasore.	2 Looms.	He has been working since the last 4 years and weaving fine dhories and sarees which he is able to sell at good prices to the local shopkeepers.
14	Purna Chandra Paramanik.	Paipara, Santipur, Nadia.	2 Looms.	He is employed in the weaving of handkerchiefs with ornamental borders and he states in his letter that his average earnings amount to about Rs. 20 per mensem.
15	Narendra Nath Barick.	Santipur, Post Office Hatigarh, Balasore.	14 Looms.	He is employed in a factory opened by the missionaries at Hatigarh.
16	Muhammad Yunus.	Sohdeeh, Post Office Sohsarai, Bihar, Patna.	2 Looms.	He closed his factory after working it for few months as he had no working capital.
17	Jaykrishna Das.	Silk Factory, Bhagalpur.	12 Looms.	It is rumoured that he has opened a silk factory in partnership with a Marwari but no advices are to hand as to what success he has met with.
18	Sarat Chandra Chowdhury.	Village Jote, Post Office Kotwali, Malda.	2 Looms.	He opened business with 2 looms but he had to discontinue his work as his house was recently burnt down.
19	Raja Ram Bhar.	Begampore, Hoogly.	2 Looms.	He is working conjointly with one of his friends.

List of Hand Looms weaving factories opened by ex-students of the Serampore Weaving Institute forwarded by Mr. Hoogewerf, after oral examination—concl'd.

Serial No.	Names.	Address.	No. of Looms.	REMARKS.
20	Aidan Coomer .	D. U. Mission, Chittarpore, Hazaribagh.	6 Looms .	This factory was opened by the D. U. Mission, Chittarpore, some years ago and after working it for some four years it closed down as it was found that it did not pay.
21	Sital Chandra Seal .	Khasbagan, Serampore	2 Looms .	Not working satisfactorily.
22	Haladhar Paul .	Thana Battala, Dutta Bagan Lane, Serampore.	4 Looms .	He has been working satisfactorily all along. He sells the products of the looms to the local merchants.
23	Dina Nath Dey .	Thana Battala, Dutta Bagan Lane, Serampore.	3 Looms .	He is working on his own account.
24	Panchanan Adar .	Thana Battala, Dutta Bagan Lane, Serampore.	2 Looms .	He is working on his own account.
25	Sashi Bhusan Gui .	Cemetery Lane, Serampore.	2 Looms .	He is working on his own account.
26	Nibaran Chandra Das	Post Office Begumpore, Hoogly.	3 Looms .	He is working on his own account.
27	Hopra Hembrom .	Wesleyan Mission, Bankura.	6 Looms	He is working as the Manager of the Wesleyan Mission Factory. The factory is paying for itself and the number of looms will shortly be increased.
28	Gopal Chandra Dutta.	C/o Babu Adhar Chandra Dutta, Serampore.	2 Looms .	Working on his own account. He manufactures fine dhooties for which there is a local demand.
29	Kali Krishna Roy .	Beliatore, Bankura .	3 Looms .	Working satisfactorily.
30	Thako Hari Chowdhury.	Suri, Birbhum .	2 Looms .	He failed on account of financial difficulty.
31	Lalit Chandra Nath .	Belka Post Office, Village Trimohini, District Rungpore.	2 Looms .	He has recently opened a factory with a couple of looms but nothing definite is known as yet about him.
32	Banchanidhi Dhal .	Dongara Post Office, Cuttack.	About 6 Looms.	He has recently opened a factory with 6 looms in the hope of being financed by one of the local zemindars.
33	Surendra Nath Barvi .	C/o Reverend D. C. Halder, Ramgarh (Chittagong).	2 Looms .	He has opened a factory with 2 looms.
34	Muhammad Asim .	Gulzarbagh, Bankipore.	6 Looms .	He worked his factory for 6 months then closed for want of capital.
35	Satish Chandra Mitra .	C/o Roy Bahadur Purnendra Narayan Singha, Bankipore.	20 Looms .	He closed his factory after working for about a month owing to the disagreement of the partners.
36	Satish Chandra Chatterjee.	Mansha, Khulna .	...	He failed on account of financial difficulty.
37	U. B. Dolapihilla .	Rajagiriya, Colombo.	About 15 Looms.	He has started a hand-loom weaving factory with some 15 looms. The factory is financed by small capitalists and from recent advices to hand I understand that the factory is a success and that power machinery will be installed shortly.
38	Khader Ali Khan .	Bunganapalli (Madras)	25 to 30 Looms.	He is supervising the Bunganapalli State Weaving Factory which is working very satisfactorily.
39	K. Swamy .	C/o K. Veerabhadra Sastry Esqr., Vizianagaram City (Madras).	More than 10 Looms.	He is doing quite well and has hopes of increasing his present plant.
40	V. V. Narayan .	C/o T. R. Raghunath Rao, Esqr., Rajah's College, Parlakemidi.	10 Looms	He died; I don't know who has taken over the charge of the factory.

WITNESS No. 115.

For Mr. W. W. Hornell.

THE HON'BLE MR. W. W. HORNELL, *Director of Public Instruction, Calcutta.*

WRITTEN EVIDENCE.

Apprenticeship and industrial schools.

1. One of the points dealt with in the questions circulated by the Commission is that of apprenticeship and industrial schools. I understand that Mr. Chatterton's view is that the raw materials of an industrial organisation are not lacking in India; that there is plenty of capital, if only it could be brought into action and that the labour available is industrious, but that the deterring cause is to be found in the fact that industry is divided into two small units. The work is split up amongst individual workers and their families, whereas modern conditions demand larger units of organisation, a minuter sub-division of labour, more regular hours of work.

On the other hand, the labourer finds the sub-divided process monotonous: he dislikes the regular hours: dislikes leaving his family circle to go to work and wants to work at home. It is difficult to make him realise that in return for these minor disadvantages his hours would be shorter and his earnings greater!

2. There have been three main types of proposals for bettering the condition of the Indian craftsman. The art amateur would revive the past: he disapproves of modern machine-methods. His proposals are not practical. A critic of another class would introduce pure European industrialism, and despises any small-scale effort: this sort of person does not realise that in many, if not in the bulk of, cases highly capitalised industry on European lines is not possible; that there is not the volume of trade to make it succeed, whereas there might be quite sufficient to bring success to a smaller concern. In any case trees grow from seeds and an intermediate stage of small-scale enterprise might lead eventually to a larger industrial system by developing an export trade from one originally confined to a local market. To start the large export business straight off would involve unnecessary risk. If we are to wait for large industrial development in India we may wait for ever! "We must lead up to it" says Mr. Chatterton. Hence Mr. Chatterton's view is that a number of workmen should be gathered into a small factory where they can make common use of a small engine, of improved machinery, of common design and information (in the supply of which Government might assist), of a central sale and purchase agency shared between several such factories.

3. Experiments were made on these lines with some success. The difficulty which arose was the question of the limits of Government interference. Is it justifiable that Government should finance industry? Is it justifiable that it should finance and manage? Should it merely finance without having any say in the management?

4. I am not going to discuss these questions: I am not a business-man; besides they have been discussed at great length already and the Secretary of State has written more than one Despatch on the subject. It is not quite clear to me what the present position is. If there is any real vagueness as to the accepted principles by which the Government of India is to be guided in dealing with this difficult matter, the vagueness should be removed. My attitude, for what it is worth, is that of the recent Bengal District Administration Committee. If Government can contribute to the development of Bengal by means other than educational, doctrinaire opinions should not be allowed to stand in the way. The means I leave to others, but I think it is unwise to ignore in a matter of this kind the apparently inevitably cumbersome nature of Government machinery. Surely if Government is ever to do anything like commerce it must be able to act promptly. Is this possible?

5. To resume:—In his "Industrial Evolution" Bucher points out that Europe reached its present economic and industrial condition through a number of stages. The earliest form of industry is *house-work*. The house owner makes for himself: there is no specialisation or barter. This stage does not postulate village life: it is "home industry." Differences of endowment lead to excess in some cases, deficiency in others. Hence barter which implies the existence of neighbours. Village life develops and a man with a special gift may decide to live by that gift, abandoning the land. He works on the purchaser's material. Where the tools are bulky, *e.g.*, a loom, the material is brought to the worker; in other cases the worker goes to the employer's house. This is *wage-work*. The next stage is reached when the worker purchases material, works all the year round, and sells the finished article for a price. This is called *price-work*. It postulates the existence of a town and it depends upon the personal touch between the maker and the purchaser. Hence the town must be small. The difficulties of the small man in capitalising himself, in tiding over the slack seasons, and in finding the money for the purchase of materials at the right time, introduce the middle man and *commission work*. The middle man becomes the sole customer: hence the worker loses direct touch with his market. This stage assumes a group of towns. The existence of the factory assumes national trade. It arises rather from a sub-division of labour than from machinery. It is more economical than individual workmanship, but it is not very adaptable either in the nature of goods or in the quality produced.

6. Where should India be placed in this development? Is it necessary that its industrial life should follow these stages? We find in Bengal a strange admixture of stages. House-work is rare, but still exists: a good deal of the cloth woven in the house is for home use. The goldsmith is an instance of wage-work. The brass-worker is an instance of price work. The potter is a commission worker. In jute, cotton, steel, we find the factory on a large scale: in soap, printing, jewellery, we see the small scale factory.

7. Reviewing the average *mofussil* conditions of Bengal it may perhaps be said that for the most part industry is in the stage of wage work or price work, but that the system is modified by the existence of cheap imports and the retail trader. Mr. Chatterton's proposal would be to substitute commission work and the small factory. The dangers of commission work are the fact that the worker is out of touch with the market. The continued existence of the small local worker is largely due to the fact that he is closely in touch with the market.

8. Then again there is the danger of the middleman. He is often oppressive. I am told that there is in East Bengal the germ of a useful little manufactory of shell buttons, but that the cost of the middleman is so excessive that the doom of the trade is inevitable.

9. Both the above dangers might be avoided by official control. Is this the sort of thing which the Industrial Bureau could control and is it likely to be capable of controlling

it? The value of the trade of any one small factory is microscopic: the workers are suspicious of the official as a new middleman who will enter and take an additional toll. It would seem as if the small factory and commission work is really a transitional stage in development containing elements which render early development or early decay inevitable.

10. There is an even more serious consideration. We find the wage worker, the commission worker or small factory, and the large factory in the same province. But they are not found in the same place. The wage worker is situated in the far-away village: the small factory is in the *mofussil* town: the large factory is in the city. Between these three there are centuries of social development. The type of industry is suited to the type of social life.

11. In endeavouring to make a small factory out of the village weaver, we are perhaps endeavouring to take an institution out of one social stage and place it in another era. It may be possible by building a railway by erecting a new steamer halt, by a new road, to make a village into a small town. Then the wage worker automatically tends towards piece work, and, as the town grows, he becomes a small factory owner. But the attempt to change the industrial type without real alteration of the social conditions seems foredoomed to failure.

12. At the same time one must admit the possibility that in some cases the social conditions may exist which render the small factory possible, but that indolence or lack of initiative have prevented its growth. It has been argued that Government might step in here. Has Government any right to step in, unless the chances of success are at least good? If any one was thinking of investing money in an embryo industry, he would ask a certain number of questions, *e.g.*

what would fuel cost?

what would transport to the customer cost? or if a middleman is employed transport to the distributor?

what would the plant cost? and finally

what would the capital cost?

13. An industry of this kind is bound to be a more or less risky venture; whereas moneylending to agriculturists is comparatively safe. A co-operative bank, which is, I am told, one of the safest investments going, if reasonable care is exercised, will pay 7 per cent. A slightly risky loan to a *ryot* is a less risky and a far more profitable investment than the factory, why then invest in industry?

14. I am exceedingly sceptical about the capacity of an external Director of Industries or Bureau to detect the possibilities of a small industry. The task would be, to say the least, one of extreme difficulty. The education of the people to detect for themselves would be a more reliable policy, but I should hesitate to say that it were practical. The man who lives in the small town and knows its requirements both in quality and quantity has a far better chance of seeing any opening which may offer. It may be that he may be too indolent to use his chance; but is there not a certain risk in that same indolence affecting the activities of the Bureau or the Director of Industries. There may be members of the Commission who have not toured in Bengal during the rains.

15. In spite of these objections it may be worth while to pay attention to the small factory, if future industrial development is likely to lead through it. It has been suggested to me that we might have an era of small factories, leading eventually to a fuller industrial development. I have my doubts, but I can realise that small scale production may arise from several causes. (i) A localised market, *i.e.*, the production of cloth on a lonely island cut off from every other part of the world would necessarily be on a small scale. I once saw a small factory in Bhola for the production of vests, etc., which seemed to be paying its way. (ii) A specialised demand, *i.e.*, the people of a certain district may desire a certain class of article which no one else needs, *e.g.*, the peculiar breast cloth of the Chakma woman of the Chittagong Hill Tracts would be a case in point. (iii) A perishable product, which may be produced near its market, because the additional costs of small scale production are less than the risks and costs of transport.

16. The earliest development of industry was accompanied by the opening up of communications and a gradual widening of the market. As the market widens, the factory increases in size, but the opening up of communications now-a-days puts an isolated part of the country into touch with the whole world. A small local artisan does not swell to a shop, thence to factory. He is apt to be faced suddenly by world products and then he usually disappears unless he develops into a factory supplying the world.

17. It looks therefore as if the factory arose not so much from improvement in the method of supply as by alteration in the nature of the demand. Improved communications, increase of population, development of education leads to an increasing similarity in taste. Men are much more like each other now than they even were before. Their tastes and their thoughts are becoming standardised; hence also their needs. This standardisation of demand makes possible the standardisation of supply. Can we suppose that time will accentuate local differences? I am afraid not: Local fads are an unstable basis for long-lived industrial hopes. It looks as if the perishable product, such as pottery, is the only one likely to rest with the small producer and there again the tendency of modern production is to displace the perishable article. We have enamel vessels, unbreakable glass, non-chip plates, and canned food!

18. One might have expected that Bucher in tracing the development of industry through marked stages, would also have pointed out that each stage of industry has an educational method peculiar to itself. In the early stages hereditary apprenticeship develops. With the advent of the small town where many different trades are gathered together it becomes possible for the parent to set his child to learn some other craft than his own. Moreover it becomes desirable for him to do so; for in the small town, unlike the village with its one official craftsman, overcrowding of crafts becomes a possibility. Hence it becomes necessary to secure (1) the prevention of over-crowding and competition, and (2) the supervision of apprenticeship. It is out of these needs that the guild arises.

19. The development of industry, the advent of commission work, and later the development of the factory make guild supervision and control inadequate. The outside competitor despises its rules. Having lost its authority as a regulator of trade, it loses its power also in the control of apprentices. Apprenticeship does not perish altogether. On the contrary, it continues to this day, but in an altered form. There are learners in most factories, but the learning period is usually, in view of the minute sub-division of processes, short. There are some who pass from one department to another as "learners" partly with a view to finding out what work suits them best, partly so as to have several accomplishments to fall back upon in event of unemployment.

20. The value of apprenticeship for the training of craftsmen in India has been repeatedly urged. The question was discussed by the Committee on Industrial Schools of 1903. The general trend of opinion is against it.

21. Apprenticeship is a contract for service on the part of the pupil and for instruction on the part of the master. The master stands in the place of the parent. The carrying out of the contract is supervised by the local community. Thus there are three parties in the matter: (1) the apprentice, (2) the master, and (3) the local community. Advocates of apprenticeship seem to be of a somewhat idealistic turn of mind. They urge the undoubted advantages of the system, *viz.* :—

- (1) the boy learns under real trade conditions: his instruction therefore is likely to be practical;
- (2) he receives individual attention and instruction; and
- (3) he is not merely taught skill, but also character: his life is regulated by the master.

22. Educationally all this is splendid, for character is everything in education. Artistically it is good, for in those trades which contain an element of art personal touch is all important. Here lies the cause of the frequent failure of the Art School. It is not so much the master's skill, but his outlook, his devotion, his attitude to the world and to his art which effects the pupil's development. Do artists come from the South Kensington School of Art?

23. The difficulty is that all the advantage are the advantages of one party only—the apprentice, and of the apprentice only for a part of the time. If apprenticeship is to succeed it must pay the boy; he must receive instruction which has a definite market value. It must also pay the master. He must receive service which is of some value to him. Hence arose the need of indenture. For the general tendency is for the boy to stay with the master just so long as he is learning and his services are practically valueless and no longer. As soon as his services become of any value, the boy goes off to another craftsman who offers him a bigger price. The master naturally expects to recoup himself during the concluding years of the indenture during which he is paying low wages for good work for the period during which the boy's services were totally useless. It is only just then that the better the master's teaching, the greater his reward should be during the final years of service. It naturally requires all the powers of the Guild to prevent the enticing away of apprentices; "Enticing" is scarcely the word, for the apprentice does not require any alluring to leave his apprenticeship if he can go and earn more elsewhere. Messrs. Labchand Motichand of Bow Bazar, Calcutta, have a most interesting school for apprentices in jewellery. They state that no boy yet during the ten odd years' existence of the school has stayed the full period. Very few stay more than 2 or 3 years at most.

24. Obviously, however, unless the master's rights are maintained the system of apprenticeship must disappear. It may be added, though the apprentice does not realise it at the time, that it is the final part of his instruction which is the most important. In that final period he learns to maintain a standard of quality—that excess of skill and delight in its exhibition, which distinguishes the artist from the mere worker. The last years of apprenticeship are in fact a training in character; but in spite of the laudable endeavours of various moral instruction leagues very few boys are able to realise or appreciate character training—at least not till afterwards. I do not think that we ought to complain about this. There are quite enough prigs in the world already.

25. The excellence of apprenticeship as a means of education must be admitted. Probably there is no method of specific education which is so good. Its practicability is at least doubtful. It does not pay the master because there is no power to enforce the fulfilment of the indenture. Moreover, under modern conditions large factories prey like parasites on the small ones and it is of course the small works, which give the best all round training. Apprenticeship does not pay the apprentice because apprenticeship is not enforced as the one

and only entrance to the craft. Without apprenticeship, or with a much shorter and less effective period learning, he can earn far more quickly and just as much.

26. The control of apprenticeship by Trades Unions in England is worth a moment's consideration. The unions have consistently opposed instruction in technical or artisan schools. This opposition has been based on fear of over-recruitment. They have favoured correspondence evening and continuation teaching, because it is given to men who are already members of the craft. Could they have a monopoly of the earlier teaching, they would undoubtedly be enthusiastic in giving the instruction, probably far more enthusiastic and far more capable than any present agency, because it would pay them. Under such conditions apprenticeship might well be revived.

27. In India there are no Trade Unions. There are a few Guilds, but they are not powerful. Caste is powerful, but it is not an industrial unit either in origin or in present function. It might become so. But it seems more probable that industrial development will be accompanied by a weakening rather than by a strengthening of caste. Had caste been adopted as an educational unit in the first instance, the result might have been different. It is in many ways a most valuable social organisation of which much use might have been made. A democratic outlook on sociology has emphasised its worst features. Probably the opportunity has passed and possibly the institution is so far removed from British ideas, perhaps so contrary to human nature itself, that there never was a possibility of a constructive policy with regard to it. Certainly caste as an active monopolist of labour and of a certain form of specific education seems quite incredible.

28. In the last resort we have to ask ourselves what does apprenticeship teach: School education produces uniformity of character; apprenticeship produces difference. That very uniformity of demand and supply in production which puts an end to the small industry, puts an end also to the training system of the small industry, in spite of all its merits. Modern industry requires inter-changeable parts, in its machinery and in its employés. It requires a standardised equipment in a worker even if that equipment be inferior. A special knowledge of one workshop is not so valuable as a general adaptability. In a word, apprenticeship, in its true meaning, training by personal influence and imitation, will not suit the large industry, and the future of the small industry is at least doubtful. As the method of teaching art, where difference and personality are the essentials, it lives still and it is never likely to perish.

29. The artisan school of Bengal is a growth arising out of the policy of 1854, the policy of providing practical instruction for the masses in their own employments; as a rule carpentry, tin-smithy, sometimes black-smithy and brass work, and more rarely basket work, are taught. Some artisan schools contain a section preparing candidates for work on zamindars' estates. The men turned out of this department are a sort of low grade surveyors. I have said above that some artisan schools contain a department of this kind. It would be more correct to say that schools which originally taught a certain sort of low grade of surveying and were subsequently developed to teach a part of the course of the Apprentice Department of the Sibpur College took up also at a certain stage in their development the training of artisans. The artisans are as a rule more or less illiterate and instruction in the three R.'s is given or supposed to be given in addition to the training in the workshops. Most of these artisan schools are not very successful. Artisans won't come at all except at very liberal rate of scholarships, and even with these they practically never remain throughout the whole course. The survey departments which provide for a low grade of professional employment for those who have been sifted early out of the selective system—the qualification for admission is the Middle English or the Middle Vernacular Examination—are exceedingly popular. In fact if you close these so called survey departments the system of Government and District Board technical schools, on the development of which the late Government of Eastern Bengal and Assam laid such store, would collapse.

30. I do not think that it is fair to blame the schools themselves. Their training of artisans is, on the whole, I think, practical and in close touch with the market. Sometimes the touch is perhaps too close, and their work is little better than that of the bazar. It is always more expensive. It would be too much to expect that they should lead the market, producing new designs and processes; yet something might be done in this way, if the schools were in the hands of really effective headmasters.

31. What is the reason for the failure of these artisan schools. The cause seems to be entangled in the perpetual discussion, which rages round technical instruction, at any rate in India. Are these schools preparing boys for present or for future industries?

32. If the training is for future industries if it is hoped that these boys will go out and create or develop new industries, are we not putting rather a heavy strain on youthful or parental optimism? A parent might send his boy to school in the hope that he will attain to a certain already existing position in an existing business. I have never met any one not even a Yankee, who entertained any definite hopes that his son would create a business and his post therein. Are we so certain ourselves that the industry will come? Even assuming the ability in the child, where is the capital? The ordinary Bengalee parent prefers to invest it in some less risky venture on behalf of his child. The obvious educational speculation is a comparatively inexpensive high school education with its lure of a Government appointment. At least in most cases the artisan school training given is intended to prepare the boy for

industry in its present condition. Here again the school is placed in a dilemma. It may endeavour to give a training severely practical, based simply on the existing processes, or it may endeavour to give a wider training in theory and practice, which will make the boy something more than the ordinary mechanical labourer. If the school gives the mere mechanical training, it is difficult to see what advantage it has over uncontrolled apprenticeship, which is the method usually employed. For if the school is practical, it must take notice of the existing conditions and processes. If this is so, is it practical to teach the use of a power-driven lathe for brass work? The child when he leaves school could not afford to purchase one, nor is his business likely to be large enough to bring him a return on such an outlay, were he in a position to afford it. Hence the school must teach merely what is done at present, and the boy's father, or his uncle, or his father's friend is probably a far more effective teacher. He is likely to be more practical: he is in closer touch with the market; he can give the boy more individual attention. If on the other hand the school attempts to give a wider training, a training far more thorough than that which the ordinary artisan master could give, its difficulty then is the narrowness of the demand. The boy desires merely to learn the specialised craft and wants to earn, as soon as he possibly can. If the school takes three years to teach him, even if it teaches for nothing, even pays a scholarship, the boy would prefer to learn rapidly the few special processes from a worker and start earning. No scholarship can compensate the boy or his parents for the loss of two years' wages. The educational superiority of the school course is a matter entirely beyond the parents' comprehension.

33. Probably the parents are right, for if wider intelligence and skill were among the conditions of the artisan's livelihood, the artisan would possess them and be able to impart them. The wider training is an attempt to produce a worker better than the circumstances demand in the hopes that he will raise his trade. It is a form of education for future needs; and this as I have pointed out is a form of education which can never appeal to the public. Socially it is an excellent scheme. Where compulsion is exercised as in German Compulsory Continuation Schools it may be successful. It can never succeed as a voluntary system.

34. The same criticisms apply to the technical school. Where the school trains for an existing form of industry, pupils may be obtained. But here the school works under a disadvantage in that most industries can give all the training they need in their own shops, and the training there given is better adapted to their own special conditions of work. The state technical school or college competing with the workshops of the larger industries as a training ground of the workers for those industries seems to me to be a monstrous anomaly.

35. Certain large employers notably railways are beginning to find that the technical training which they are able to give to their apprentices in their workshops require supplementing by some more effective and thorough form of general instruction than they are at present able to provide. They are beginning to feel that it would be an advantage to have efficient schools for general supplementary instruction attached to their workshops. I am not at all sure whether this will not be found to be one of the most effective ways in which Government can contribute to the production of efficient workers. The Governing Body of the Civil Engineering College are now considering whether it would not be possible to arrange for a much closer co-operation between the Apprentice Department of that college and the large employers of labour especially the railways.

36. A great deal has been written on the question whether technical and industrial schools should be under the Education Department or the Department of Industries, where one exists. On general principles I am in favour of a strong Department of Education which should develop in co-ordination all the various aspects of the educational system. I have always advocated this and opposed any transfer of technical colleges or schools from the Education Department. I am now, however, beginning to see that in administration generally, education is after all one of the aspects of administration, we have in India certain machinery which has somehow grown up and cannot be scrapped or even very seriously modified. The question therefore of the relative spheres of activity of the Departments of Education and Industries is one which I should decide on local considerations of practical convenience rather than on general principles. While I know that the Director of Industries, if he is to effect anything, will have to proceed by means which are in no sense educational and while I think that it would be unwise to impose upon him to start with any responsibility in connexion with existing technical or industrial schools: I do not consider it would be either logical or wise to deprive him of all influence over these institutions. If these institutions do not bear on the development of industry what is the use of them? If they do, surely the Director of Industries ought to have some say. There are now so-called schools with very little which is scholastic about them. If under the influence of the Director of Industries these institutions can be made to serve a more useful purpose by being converted into something which is in no real sense a school at all, so much the better. It makes very little difference what they are called. I am doubtful whether general uniformity of treatment is either possible or desirable. If the Director of Industries found that he could take an industrial school and make any practical use of it in any scheme which he had in hand in developing local industries, then I would say let him take that school over. Let things be as they are until an Industrial Department has not only been started but has been working for some two or three years. It is idle to discuss details of machinery, when we are still absolutely vague as to what it is practicable for us to attempt.

The relation
between the
Departments of
Education and
Industries.

Note on apprentice schools in engineering works and their relation to other forms of technical education.

[N.B.—This note has been compiled on the basis of information received from the Board of Education, Whitehall, London, S.-W.]

1. Within the last few years the movement for training the artisan for the work he is employed upon has found almost simultaneous expression in various parts of the world. The United States of America, Japan, France, Germany, and Great Britain have occupied themselves with this problem; and although the methods adopted by these countries differ very considerably one from the other, yet the idea expressed in the works school is common to nearly all of them.

2. *Developments in Foreign Countries.—Germany*—In the larger industrial centres in Northern Germany it is usual for an apprentice school to be provided in each works, or for a single school to be established in a central position to serve several works of a given kind. Such schools are recognized by the State, and students attached to them are exempt from attendance at the compulsory continuation school.

3. *France*.—In France there is no national scheme for training artisans, but an association has recently been formed for the study of industrial arrangements and of various methods of training with a view to planning a national scheme for the training of apprentices.

4. *The United States of America*—In the United States there is as yet no national scheme for vocational training, but a strong movement in this direction has been manifested in many localities. Co-operative or half-time schools have been developed, in which the boys work in pairs and alternate week by week between school and workshop, one of the pairs being at school while the other is at work. Apprentice schools have been established in many of the large engineering works. Such works include the Pennsylvania and other large Railway Companies; the Westinghouse Electric and Machine Companies; the General Electric Company, Yale and Towns; Brown and Sharpe, Packard, Cadillac, and other large Motor Companies; the American Locomotive Company, and many others.

5. *England*.—Apprentice schools have been established in England in connection with the following works: the Royal Dockyard (four schools); the Gas Light and Coke Company, Westminster; R. W. Paul's Instrument Works, New Southgate; the British Westinghouse Company, Manchester; the Midland and Great Northern Railway Works, Melton Constable; the Post Office Engineering Department, London; Head Wrightson & Co., Thornaby, Yorkshire; the South-West Railway Works, Eastleigh. Most of these schools aim at giving a training in the scientific principles of engineering to selected apprentices, rather than at training the rank and file for their daily work. The schools of the British Westinghouse Company, R. W. Paul, and the Post Office aim at training the ordinary artisan for his work.

6. *The educational needs of the ordinary artisan*.—The Educational needs of the ordinary artisan may be summarized as follows:—

- (a) Instruction in workshop methods and procedure.
- (b) Instruction in the use of tools.
- (c) Instruction in elementary science, drawing, and calculations bearing directly upon the trades concerned.
- (d) Instruction in non-vocational subjects of a scientific, technical, or literary character to afford an interest in life outside the work of the artisan.
- (e) Instruction in the rights and duties of citizenship.
- (f) Some form of selection whereby students who show exceptional ability in the trade training may be afforded further training of a higher character.

7. *The existing means in England for training artisans*.—At the present time an attempt is being made in England to meet some of the needs referred to above by means of the following agencies:—

- (1) Junior technical schools.
- (2) Part-time day apprentice courses.
- (3) Minor evening courses in senior institutes.
- (4) Trade courses in evening continuation schools.
- (5) The workers' educational association classes.

8. *The magnitude of the problem in England*.—The census return for 1911 showed that the total number of males engaged in engineering work was approximately 828,000. This total was made up as follows:—

General engineering and machine-making	416,000
Tool-making	50,000
Electrical apparatus	84,000
Ship and boat-building	104,000
Vehicle-building	174,000
Total	<u>828,000</u>

The proportion per 1,000 of all occupied males in England and Wales for the age-range 15 to 20 years during the period under consideration was 133, or 13·3 per cent. On this basis it was estimated that the total number of workers in the engineering industry of 15 to 20 years of age amounted in 1911 to about 110,000. It was assumed by the Board of Education that all these youths ought to receive some sort of training for their work, but it was considered probable that a large number of them would be engaged upon work of a more or less unskilled character. The Board ascertained that in the British Westinghouse Company's Works the apprentices who were attending the works school in 1911 formed 7 per cent. of the total number of persons employed. They applied this percentage to the total number of male workers then employed in the engineering industry, and calculated that about 58,000 would require training for skilled work. The Board took this number as being evenly distributed over the age-range 15 to 20 years, and found that about 11,600 youths were entering the industry each year, and assumed that a training was required for this number as a preparation for their skilled employment.

9. *Junior technical schools.*—The Board of Education went on to discuss the agencies then existing in England for the training of artisans (see paragraph 7 above). They observed that the proper function of the junior technical school (engineering) appeared to be to give a pre-apprenticeship training to boys who would ultimately become charge hands, foremen, or shop engineers. They remarked that it was most desirable that boys sent to these schools with scholarships should be selected with care and with a view to their future careers. The Board added that in the London elementary schools the best boys were selected for transfer to secondary schools, the next best for transfer to central schools, while the junior technical schools were recruited from the residue. The Board stated that some adjustment appeared to be desirable between the aims of the junior technical schools and the central schools, and that the most effective arrangement would seem to be that the central school should aim at pre-apprenticeship training for boys who would ultimately become skilled artisans, and that the junior technical schools should train selected boys who would ultimately fill the more important artisan positions, such as foremen, etc.

10. *The functions of part-time day courses in technical schools.*—The functions of part-time day courses were stated as follows :—

- (a) To give a supplementary training to youths who have shown marked ability in works schools or evening courses with a view to training them for leading artisan positions and to selecting those of marked ability for further training in full-time day courses.
- (b) (In towns with a considerable number of small works of a given kind.) To work in conjunction with a "central training workshop," and to train the rank and file on the same lines as in an apprentice school in a large works. To select youths of marked ability for further training under (a) above.

11. *The functions of evening courses for artisan students.*—The functions of evening courses for artisan students were reported to be—

- (a) The provision of minor courses giving a trade training, and the selection of the best students for part-time day training.
- (b) In certain cases to provide instruction in science, drawing, and mathematics supplementary to the instruction given in an apprentice school in a works.
- (c) The provision of courses in non-vocational subjects. The question as to whether trade instruction should be given in junior courses is one that calls for serious consideration, and cannot be dealt with adequately in this note.

12. *The position of apprentice schools in works.*—Although the problem of training the rank and file of the industrial army has been attacked in England it has not yet been adequately treated, and a full solution has yet to be found. The Board of Education recognized the importance of the matter, and in a memorandum on the teaching of engineering in evening schools they described a number of minor courses for various trades which might provide a partial solution to the problem. These minor courses, however, have as yet not been extensively adopted, and no clear line of demarcation has been drawn between the work of the major and the minor evening courses. The present English system of technical education in evening schools appears to have developed from the top downwards, and an academic atmosphere still clings to the instruction given to artisans, making it remote from the daily work of the shops. It is essential that this academic atmosphere should be removed, and that it should be replaced by a "works" atmosphere. The reason for the institution of apprentice schools in works is to be found in the growing conviction amongst employers that under modern conditions of work in the shops it is not possible for the foremen to impart to apprentices as much theoretical and practical instruction as they require in order to carry out their work properly and in the most efficient manner. Coupled with this fact, the employers have recognized that the scheme of technical instruction has called for voluntary attendance on the part of artisans, and has offered to them a training that will fit them to rise to higher positions ; but it has not given to the rank and file a training which will fit

them for their everyday work. The works school appears to meet this need in a very efficient manner.

13. *Advantages of works schools.*—The apprentice school in works appears to possess the following advantages:—

- (1) The question of compulsory attendance is dealt with by the employer in his indenture with the apprentice. Compulsion applied in this way is less likely to be resented than when applied directly by the State.
- (2) The employer is responsible for the trade instruction, and can assure its being carried out on lines to suit his requirements.
- (3) The instruction is given under conditions which cause the least disturbance to the work of the shops, and it is given at times best suited to the employer. On the other hand it must be recognized that works schools can only be established with advantage in fairly large works, and that small works must be dealt with by the establishment of "central training workshops" and by part-time day and evening classes. It may be urged that the instruction in science and calculations given in works school might be better undertaken in a technical school, but in a large works the instruction in these subjects of a character suited to the ordinary artisan could quite well be given by young engineers on the works staff.

Memorandum on some classes for railway apprentices in England.

[N.B.—This memorandum has been compiled on the basis of information received from the Board of Education, Whitehall, London, S.W.]

1. *Great Eastern Railway, Stratford, with repairing works at Ipswich, Norwich and Peterborough.*—There is a scheme in connection with these works by which certain apprentices obtain certain advantages. An apprentice must have been in the works for three years and have attended work regularly and given satisfaction; he must have attended classes at the company's mechanics' institute at Stratford, and be able to produce certificates that he has worked there satisfactorily. He has to pass a local examination embracing certain of the Board of Education and City and Guilds subjects. When he has fulfilled these conditions he may submit to the head of his department in the works a course of full-time study which he proposes to follow for a period of six months. Should this be satisfactory to the company he will be allowed to absent himself from the works for six months with full pay. The institute at Stratford, which is the property of the railway company, is not assisted by the Local Education Authority, but receives a grant from the Board of Education, and the company take a considerable interest in the work of the institute and provide for its maintenance. In connection with the classes held at the institute the company have practical classes at the works, in which students have the opportunity of using testing machines and of taking indicator diagrams from steam engines, etc. These classes are not recognized by the Board of Education for the purposes of grant. Special prizes are given by the company to a considerable extent. The approximate number of premium apprentices is 40, non-premium apprentices 460, and workmen 5,000. About 350 of the apprentices attend evening classes. Encouragement is given to apprentices to attend classes, in that promotion is made only to those who have shown ability in the evening classes as well as in the works.

2. *Great Northern Railway Company, Doncaster.*—The work done comprises locomotive, carriage, and wagon building. There is no definite scheme of education. The Great Northern Railway pay the fees of apprentices who attend evening classes and part of the fees of apprentices who attend afternoon classes at the technical school; they also give annual prizes to their students to the value of about £20 a year. The Chief Locomotive Superintendent is a co-opted member of the Higher Education Sub-Committee of the Doncaster Local Education Authority. There are 40 premium apprentices and 700 non-premium apprentices in the works. About 4,000 men are employed. Of the apprentices, about 25 premium apprentices and 110 non-premium apprentices attend technical classes. It is usually found that the premium apprentices attend the day classes and the non-premium apprentices the evening classes. No special privileges in the way of "time off" are allowed to apprentices attending evening classes. Periodical reports are sent to the company with regard to both day and evening students.

3. *Great Western Railway Company, Swindon.*—Locomotive building and carriage and wagon building are carried on here. There is a definite educational scheme approved by the company. The preliminary year of technical training is given in courses held in five evening schools built and equipped by the Borough Council and aided by the Local Education Authority. The technical school is managed by the governing body, which includes representatives of the company.

According to the company's regulations, all apprentices are expected to acquire a knowledge of practical mathematics, practical mechanics, geometrical and machine drawing, heat, electricity and chemistry. Those who have not had previous scientific training are expected to attend

the preparatory classes which are provided for students from 14 to 16 years of age. Subsequently they are expected to attend the engineering course which is provided for those between 16 and 21 years of age. Each apprentice is required to keep systematic notes of his studies. He is also required to make a record of his observations in the workshops, accompanied by neat sketches.

In order to encourage good work in the evening classes, it has been decided that when apprentices attend the engineering classes regularly three evenings a week and give evidence of industry and perseverance, their absence from the factory before 9 o'clock on the three mornings immediately before or immediately after the classes will not be recorded against them. The Great Western Railway Company also offer a number of day studentships to be competed for by apprentices between 17 and 18 years of age. Candidates for these must have regularly attended, for at least one session, the evening grouped courses in engineering at the technical school, and must have been at least 6 months in the factory. The successful students will attend two half-days a week for 26 weeks at the technical school. They will have their wages paid as if they were in the factory, and the railway company will pay their school fees. Capable students will continue for a three-year course, and those who distinguish themselves will be allowed to spend part of their last year in the drawing office or the chemical laboratory. The number of free studentships to these day courses will be limited to 30 at any one time, generally in groups as follows for a three-year course; first-year course 15 students; second-year course 9 students; third-year course 6 students. For each year's course there will be a competitive examination, successful students passing from one year's course to the next.

A monthly report is furnished by the principal of the technical school to the company on the work of premium apprentices and weekly report is furnished on those attending day classes and on those who claim the privilege of early morning leave.

4. *Midland Railway Company, Derby.*—Locomotive building and carriage and wagon building are done here. There are three types of apprentices: privileged apprentices, pupils, and ordinary apprentices. With regard to privileged apprentices, during the period of apprenticeship each apprentice is required to attend the classes held at the Derby technical school during two mornings a week, or any other course which may be determined from time to time. On these days he will not start work in the shops until 2 P.M. Each year of service he will be expected to sit for any examinations in technical subjects which may be held for the employes in the Chief Mechanical Engineers' Department. With regard to pupils, the conditions are similar to those of privileged apprentices, except that each pupil is required to pass the students' examination of the Institution of Civil Engineers before the end of his third year in the works. Persuasion and advice are given to induce ordinary apprentices to attend the evening classes, but there is no compulsion with regard to these apprentices. An examination is held in Derby every year, open to any apprentice who has been attending evening classes. Superior posts are given to those students who show merit in this examination. There is an institute conducted by the company which is not aided by the Local Education Authority. The only subjects taught in the institute are French, shorthand and German. The privileged apprentices and pupils attend the classes at the technical college. The company does not aid the technical college, nor is it represented on the governing body. The privileged apprentices and pupils number about 40. The ordinary apprentices number about 535. The workmen, excluding apprentices, number about 4,000. Any apprentice who attends evening classes and asks on that account to be excused overtime is so excused. Reports are sent to the company with regard to the progress of its apprentices in the day and evening classes.

5. *Midland and Great Northern Joint Railway, Melton Constable.*—No definite educational scheme exists, but all non-premium apprentices under the age of 18 must attend, in the company's time, a class in workshop mathematics of 1½ hours a week for 39 weeks in the year. The company allows the use of a good institute heated and lighted practically free for evening classes. The company provides a teacher free of expense for the afternoon class mentioned above. The parents of apprentices are required to sign a form stating that their boys will attend two evening classes each winter. Promising students are given chances of improvements by being taken into the office. The company officials make liberal offers of prizes. The committee consists of certain of the company's employes, and receives a grant from the Local Education Authority. There are 8 premium apprentices, 100 non-premium apprentices, and 500 workmen.

6. *North-Eastern Railway Company, York.*—Carriage and wagon building and some repair work are carried on. There is no definite scheme approved by the company for the technical training of their apprentices, although it is understood that notices will be issued that in future apprentices will be required, on admission to the works at the age of 16, to give evidence that they have some acquaintance with machine drawing, applied mechanics, and mathematics. Classes are held at the North-Eastern Railway Institute, a building provided by the company. The institute serves as a technical school for York so far as engineering is concerned. The Local Education Authority subsidize it to the extent of £250 a year. There are 4 premium apprentices, 136 non-premium apprentices and about 2,000 workmen employed by the railway in the works. Apprentices who attend evening classes are allowed to leave work early, but only by special permission, and only two apprentices have obtained this permission. The company has given some apparatus to the technical school.

Note on some part-time apprentice courses which are conducted in England for engineers.

[N.B.—This note has been compiled on the basis of information received from the Board of Education, Whitehall, London, S.W.]

I.—THE ROYAL DOCKYARD SCHEME.

1. The apprentices are employed in the building and fitting of ships for the Navy. They include shipwrights, engineering fitters, ship fitters, electrical fitters, boiler makers, caulkers, coppersmiths, founders, joiners, painters, pattern makers, plumbers, rope makers, sail makers, smiths, etc.

2. The dockyards are at Chatham, Sheerness, Devonport, Plymouth, Portsmouth, Pembroke and Haulbowline.

3. The apprentices are selected when between the ages of 14 and 16 years by means of a severely competitive annual examination; hence if a boy takes the examination at 14 and fails, he has another opportunity of sitting for the examination at 15 years of age. The period of apprenticeship was formerly seven but is now six years. The annual entry of apprenticeship is adjusted roughly to the annual loss through death, promotion, superannuation or other causes, and hence it rarely happens that an apprentice is discharged on the completion of an apprenticeship. The competition for these places is very keen. There are about 40 candidates to each vacancy. The better apprentices are promoted to such positions as draughtsmen, recorders, inspectors, etc. By means of Admiralty scholarships the best are able to proceed to the Royal Naval College at Greenwich for a further training with a prospect of securing appointments in the Constructive and Engineering Branches at the Admiralty. The dockyard schools were founded in 1843 at a time when there was little, if any, provision for technical education in dockyard towns. Their objects were not only to create a body of educated men from which could be recruited the designers and builders of ships for the Royal Navy, but also to increase the efficiency of the workmen as a whole. Many examples could be quoted of apprentices who ultimately have filled such positions as Director of Naval Construction and Assistant Directors and Engineers at the Admiralty; while many have passed into the service of private engineering and ship-building firms, and have become eminent designers or have occupied other positions of responsibility. At the present time, when compulsory attendance at continuation schools and the more general adoption of the part-time day system are being advocated, it is interesting to observe that the best example of this system which can be furnished is one which was initiated by a Government Department 70 years ago. The success of the system has been so remarkable, that it is surprising that it has not been adopted by a larger number of engineering firms. Attendance during the day-time while the apprentices are fresh, the disciplinary effect of compulsory attendance, together with the chances of promotion offered have produced remarkable results. The progress of the students through the schools is as follows.

4. Of the successful candidates at the entrance examinations the better section proceed to what is called the upper school, which they attend for 12 hours a week, made up of 3 hours on each of two afternoons and 2 hours on each of three evenings in such a way that they attend only on three different days in the week. The weaker section attend the lower school for 7 hours a week, made up of 3 hours on one afternoon and 2 hours on each of two evenings. The course in the upper school extends over 4 years, and that in the lower school over 3 years; in each case for 40 weeks in the year. Annual examinations are held in both schools, external examiners being employed in the case of the upper school. In the case of the lower school examinations the papers are set and marked by the staff. On the results of these examinations apprentices in both schools are weeded out rigorously from each year of the course, those remaining behind being promoted. Those who are rejected remain in the dockyard, but for further theoretical training they have to rely upon the technical school, which is maintained by the Local Education Authority.

II.—WOOLWICH ARSENAL TRADE LADS' SCHEME.

5. The following regulations govern the entry and training of trade lads at the Royal Ordnance Factories at Woolwich :—

(i) Entry—

- (a) An entrance examination is held annually in June.
- (b) The age of a candidate must not be less than 14 nor more than 16 years on 1st January preceding the examination.
- (c) Intending candidates must apply in their own handwriting between the 1st April and the fourth Saturday in May on a form which will be supplied on application to the Chief Superintendent, Ordnance Factories.
- (d) The vacancies are filled by candidates in the order of merit shown by the examination, provided that in each case not less than half the maximum number of marks has been secured in each subject.
- (e) Qualified candidates before entry into the workshops must be passed as fit by the Ordnance Factories Medical Officer.

- (f) The candidates are, in order of merit and subject to the convenience of the Ordnance Factory, allowed to choose the trade and department in which they will be trained.
- (ii) *Subjects of entrance examination—*
- Elementary mathematics.
 - Elementary physical measurements and their applications.
 - English.
 - Drawing.
- (iii) *Work in factories—*
- Trade lads are subject to the Ordnance Factories rules and regulations.
 - Each trade lad is attached to a competent workman, who instructs him in the use of his tools during the first three years in the workshops.
 - A lad showing an exceptionally good record of progress in the course of compulsory study detailed below receives, at the convenience of the department, a preference in being moved to different workshops while learning his trade and in receiving facilities in the drawing office.
 - Trade lads are not required to work overtime of nightshift during their training.
- (iv) *Work at the Woolwich Polytechnic—*
- During the first four years of their training all trade lads are required to attend the classes at the Woolwich Polytechnic detailed below.
 - If a lad does not attend these classes regularly, or if an unsatisfactory report is received of his progress, he is dismissed unless exceptional circumstances can be shown to exist.
 - Trade lads have leave with pay one afternoon per week during the first three years of their training to attend classes at the Polytechnic on one afternoon per week. During this period they also attend classes on three evenings per week for 40 weeks in the year. In the fourth year the lads attend for three evenings per week only.
 - The school fee is refunded to each lad at the end of his year's course if a satisfactory report of his attendance and progress has been received. The fee for the fourth year is payable by the lads and is not refunded.

III.—THE GAS, LIGHT, AND COKE COMPANY'S SCHEME.

6. The scheme was established in 1908 by the Gas, Light, and Coke Company in co-operation with the London County Council for the training of their gas fitters and apprentices. The theoretical work is done in part-time day classes and in evening classes held by the London County Council Technical Institute, Westminster. The practical training is carried out on the Gas Company's premises in special workshops which have been equipped for this purpose. The whole course extends over a period of six years.

(i) *Students.*—Applications are invited by the London County Council from pupils attending elementary schools in the district, and direct applications are made also to the Gas Company by sons or relatives of their employes. There are at present about 100 lads in training, and the Gas Company pays them from 2s. 6d. per week in the first year to 22s. 6d. a week in the final year of their apprenticeship.

(ii) *Theoretical work.*—Instruction is given in technical calculations, engineering drawing, English, elementary physics, and gas supply. The theoretical instruction averages 5½ hours per week throughout the course.

(iii) *Practical work.*—Practical training comprises 12 months in the special training workshops for 36 hours per week; 18 months on gas work in the district as assistants to fitters; 12 months as fitters' mates; 6 months meter testing; 6 months mantle maintenance department; 6 months mantle department; 6 months fitters; 6 months in show-rooms; 3 months in office; and 3 months estimating.

(iv) *Subsequent employment.*—At the end of their training the lads are continued in the company's employ, either as skilled artisans or as staff representatives.

IV.—THE MANCHESTER SCHEME.

7. Arrangements have been made between the School of Technology, Manchester, and about 40 engineering firms in the district whereby selected apprentices attend at the school for one day a week from 9 A.M. to 5-30 P.M. for 40 weeks per annum. The complete course extends over two years.

8. There is a strict entrance examination, and at the present time about one-third of the candidates are rejected.

(i) *Curriculum.*—First year: mathematics, mechanics, physics, and engineering drawing. Second year: mathematics, mechanics, heat engines, and engineering drawing.

(ii) *Reports and Certificates.*—Monthly reports are furnished to the employers of the attendance and progress of the students. Internal examinations are held in all subjects at

the end of each session and certificates are awarded to those students who have attended for two sessions and have passed the examinations in all the subjects of the course at the end of each session.

ORAL EVIDENCE, 7TH DECEMBER 1916.

President.—*Q.* You say speaking of apprentices "As soon as his services become of any value, the boy goes off to another craftsman who offers him a bigger price." We have heard the same complaint from firms when we asked them what they were doing to train their young men. When one takes that statement into account with the fact that in this country you can never get an apprentice to pay a premium but on the other hand he has to be paid from the beginning, does not that indicate that there are far too few expert workers for the work to be done and consequently is there not room of a very definite kind for the development of elementary and industrial schools?—*A.* I think so.

Q. With regard to our schools and colleges you have great difficulties in getting them filled except by bribes in the form of scholarships. Is it likely that a boy will value his education and his training unless he pays for it?—*A.* You mean technical schools?

Q. Yes?—*A.* The evil of the scholarship system is that it very often tempts a boy who has no sort of capacity in a mechanical direction into a technical school. The B classes have failed in Bengal. Speaking generally the type of boy who was and is attracted to these classes is the boy who cannot pass the Matriculation Examination.

Q. The apprenticeship system at home by which a boy is bound for five years has generally worked without any difficulty. Is that largely due to the fact that the boy has paid for it and stays for five years to get value for his money?—*A.* Yes, I think so.

Q. The remark made by Messrs. Labchand Motichand is very similar to the remark made to me by a member of the Commercial Institute here. I do not see how you are going to meet this difficulty?—*A.* I do not quite see how it is to be met. The position in Bengal seems to be this. Every boy of any social position or ambition wants to obtain a University degree. This is also the goal of all his parents' hopes. Every sacrifice will be made both by the boy and his parents when University examinations are the objective. A boy does not ordinarily go to a technical or commercial institution, unless and until he has definitely fallen out of the course which leads to a University degree. He is then a failure, flotsam which tends to drift.

Q. What is the value of the University degree?—*A.* It is the one gate to Government employment and to the favoured professions. If a young man can secure both a M. A. or M. Sc. and a B. L. degree he has 2 sets of openings before him. The Commission do not perhaps realise the enormous differences which it makes to a man's career in Bengal whether he has had to stop at the B. A. stage or has been able to secure the M. A. degree. I am compelled to offer B. A.s who are foolish enough to enter the Education Department as teachers Rs. 35 a month in the Lower Subordinate Educational Service, while an M. A. if he is fortunate enough to get into a college may begin on Rs. 200 a month in the Provincial Educational Service.

Q. One cannot say that Government is doing wrong by offering these attractions?—*A.* Possibly not, though the effect of making your educational system your direct sifting machinery for office and professional employment is overwhelming and I think disastrous. The position would not be so difficult in Bengal if the standards of the various educational grades were reasonably high. If it were made more difficult to get a degree, fewer would enter for them and those who secured them would represent a more uniform level of efficiency. Similarly as regards secondary schools, if there was a reasonable standard of admission to the secondary stage of education, fewer incapables would enter it and the general effect of secondary education on the community would be far more beneficial.

Q. The standard of examination here is fairly comparable with the examinations in England—I don't say of the Matriculation but of the degree examinations?—*A.* I cannot express any positive opinion because I have not been an examiner for the Calcutta University for many years. When I did examine for the B. A. and Intermediate Examinations my impression was that a great many unfit people went in for the examination and that many such passed. If you study the results, you find that there are a very large number of people who just get the pass marks and a few more. I do not think that this is the case in England in degree examination. Any examination finally adapts itself to the level of the candidates who go up for it.

Q. One thing that I have, as an examiner of the Calcutta University, felt is that there is a sort of uncomfortable feeling that you have to give the men marks for the answers they have given but you feel all the time that they are not fit for the University. I have found it difficult to analyse the feeling of discomfort. Have you felt that as an examiner?—*A.* Very strongly! In a subject like English literature, one felt that the whole thing was an elaborate and tedious joke—that a large number of hardworking and estimable young men had been compelled by some sinister but utterly stupid tyranny to waste the most precious years of their life in studying something which was utterly meaningless to them, while at the same time it was admirably calculated to make it almost impossible for them to get what they did want, namely a working knowledge of the English language.

Q. Do you think that matters would mend to some extent if we had a more extended system of primary education followed by simple industrial education?—*A.* I think that is probably in Bengal a necessary ingredient in the solution of the general problem.

Q. But at present the masters who are in charge of these primary schools are paid on a scale that surely does not attract the best type?—A. A man starts a school (the mere fact of his having done so entitles him to masquerade under the once respected title of *pandit*); he runs it for a certain time and the District Board gives him perhaps 2 or 3 rupees. Then perhaps the *pandit* goes away or gives up teaching and the primary school ceases and there is probably nothing to put in its place. What is known as the District Board Primary School system was started in East Bengal. Under this system the District Boards provide a certain number of school houses in which specially selected *pandits* hold their classes. Each such *pandit* gets a special allowance from the District Board. Fees are also levied and divided among the *pandits* of the school. The advantage of the system is it gives certain of the better primary school *pandits* a fixed and suitable *habitat* and reasonable emoluments.

Q. In Bombay I saw a scheme that was carried out in the Victoria Jubilee Technical Institute. They have a system of marking which begins when the boy enters and lasts throughout the whole of the four years' training. He gets marks for the quantity of work done as well as quality and he is allowed to work within certain hours. That means that the boy has to be prompt in everything that he undertakes. That must come into the boy's character after four years' practice and is exactly the kind of practice that distinguishes a business man from men of many other classes. If your results are based entirely on examination work I do not see how you can avoid developing a wrong kind of character. Is it possible to introduce such a spirit into our colleges and industrial schools?—A. Such a scheme appeals to me very strongly. I should like to see it tried in Bengal.

Q. That means the addition of a fairly large staff to carry out the scheme?—A. Yes, that would be necessary.

Q. I have heard a good deal from time to time of schemes proposed in Bengal for a technological institute and a school of mines and various reforms of the Sibpur Engineering College, many of which were attempted to be carried out for a short time and then abandoned. There is a state of feeling that there is no policy that nothing continuous has been done and there is no aim as far as technical and industrial education is concerned. I do not know if I have a correct idea of the state of affairs but if it is correct it seems to me that there is educational anarchy.—A. There have been a great many schemes which have not only not materialised but they have not even been worked out to definite conclusions. A detailed industrial scheme was worked out for Eastern Bengal and Assam by the Government of that province; this scheme centered round the Dacca Industrial Institute. A complete and elaborate scheme for the establishment of a technological institute in Calcutta has also been evolved. Not many years ago it was decided that the removal of the Civil Engineering College from its present location at Sibpur was a matter of imperative and urgent necessity. The sale of the site to the Port Commissioners was actually sanctioned by the Secretary of State. Many problems appear to have been involved in this removal and they were discussed at great length both by Committees appointed *ad hoc* and in the Secretariat. Then came the repartition and discussion broke out again. All that I have been able to do is to write a history of the whole business.

Q. Many of these have been started?—A. Nothing whatever has been started except a tinctorial department at the Sibpur College and that has been closed, because there were no students.

Q. And there was an agricultural section started.—A. There was at one time an agricultural section at Sibpur but that was closed years ago. The question of agriculture did not come into the chain of discussions which I have just outlined.

Q. Does not mining come within the chain of discussions?—A. The whole question has pivoted on the Sibpur College and its future. As you know, the Sibpur College now has a mining class and it has also a collegiate department of civil engineering and an apprentice department. The idea was that the collegiate department of civil engineering should become part of the Dacca University and that the mining instruction should be transferred to a school of mines in the mining district. A scheme was worked out for a school of mines. The apprentice department of Sibpur was to form the nucleus of the Technological Institute which was to be established in Calcutta. You can imagine that all these proposals involved considerable expenditure.

Q. It has been suggested to us that technical education ought to be made an imperial question that, for instance, our engineering colleges should be so governed that they should be colleges for all India, for instance Sibpur College would not be for Bengal alone, that there ought to be some scheme of imperial technical education and that the colleges should be specialised for particular branches of engineering or technology. Have you thought out that scheme?—A. It seems to me that as regards the training of the higher grade of engineers a system of Imperial colleges would be the best. I do not see any particular advantage in having engineering colleges under provincial Governments but then I am thinking only of the collegiate department of engineering. I am not thinking of the Sibpur apprentice department.

Q. That of course is a kind of training that might be reserved for the Local Government?—A. Yes, and I fancy that the reason why the people who worked out a scheme for an engineering college at Dacca dissented from the idea of a system of Imperial engineering colleges was because they thought that the Dacca University was going to be a teaching

University of a modern type and they conceived that it would be a great advantage, if the training of the higher grade of engineers could be made a part of the work of the University.

Q. You would not object to some scheme of that kind in which all the higher forms of technological and engineering education and research should be conducted by an imperial machinery while the industries should be run locally and consequently the artisan's education should be conducted by local Governments?—A. So far as I can see, I think that this would be a very much more effective way of dealing with the matter.

Q. What about the difficulties of boys going from one college to another?—A. A Bengalee would gladly go to Roorkee if he had the opportunity. People come to Sibpur from Burma, Bihar and Orissa.

Q. Would there be any difficulty about hostel accommodation?—A. We have never found any difficulty. Bengalee students go to any part of the world. Apart from the Government scholarship holders, there are a number of boys sent annually by the Association for the advancement of scientific and industrial education of Indians to England, America and Japan. So far as I know, this Association has never experienced any difficulty in finding recruits, nor have these recruits ever shown any reluctance to leave India and go anywhere.

Mr. C. E. Low.—Q. Your note points to the fact that the examinations at present conducted are now little else but a passport to entering Government service?—A. They are the necessary preliminary qualifications.

Q. A youth has nothing else to do, after passing the examination, except the exercise of necessary tact, diplomacy and influence?—A. I understand that this is largely the case.

Q. These examinations have been viewed by Government as means of assisting in the selection of candidates for Government employment?—A. Yes. Even the Sub-Inspector of Police must now be a B. A. (practically).

Q. Do you think it is right for Government to throw that onus on to educational institutions and save itself the trouble?—A. I think that the question which you have just asked me is a very difficult one.

Q. Have you ever considered the idea of educational institutions being allowed to have their own examinations for their own purposes and the Government itself assuming the duty of conducting examinations for the various branches of the public service?—A. I have often.

Q. Do you think it is a practicable idea?—A. I am not quite sure. One hesitates to be dogmatic about anything in India, least of all about educational problems. There is certainly a good deal to be said for your suggestion. What I feel is this:—The present system makes any real University education difficult, if not impossible. University teaching should be "scientific, detached and impartial." This necessitates the teachers enjoying a considerable degree of freedom but so long as University qualifications are the necessary preliminaries to admission to Government service or the favoured professions, so long will the community never acquiesce in the University teachers' teaching what they like and conducting their own examinations.

Q. Is not that position created by the Government? To a certain extent it renders it impossible for an industrial bent to be given to boys under our present system of education?—A. Yes. The tendency of selective education is always to sacrifice industry and agriculture to the professions. I have before me some notes from the Board of Education and from them I find that from the London Public Elementary Schools, the best boys go with scholarships to the secondary schools, the next best go to the central schools, while technical schools are recruited from the residue. This tendency cannot be tolerated indefinitely. The position has got to be adjusted.

Q. Don't the boys regard scholarships in technical schools and scholarships for technical instruction in England much more as an end in themselves than a means of obtaining technical instruction?—A. That is the case. We pay a research scholar Rs 100 a month which is in many cases more than he can hope to earn when the term of his scholarship is over. Naturally the ordinary Bengalee young man (and many of the research scholars are very ordinary) would like to continue to be a research scholar for an almost indefinite period.

Q. You say that the students leave technical school fairly early and one reason was suggested that it was because there was a demand for their service. Is there not perhaps a greater reason than economic pressure to earn something for themselves and their families?—A. I think that this is to some extent the case. I should like however to qualify this statement by a suggestion which I have already made. The Bengalee student who finds his way to the apprentice department at Sibpur has almost invariably started out with the hope of eventually securing a M. A. or M. Sc. degree. If a student has for some reason or other fallen out of the University course, he goes to an engineering college or to some other technical institution. When therefore a student comes to the engineering college he has practically abandoned all his brightest hopes and whether he stays for the whole course or not does not seem to matter much.

Q. Have you found by any chance that a boy of well-to-do family taking up technical education is more likely to stick up to it than the poorer classes?—A. I do not know of any example. I do not say that such cases do not exist.

Q. You expressed yourself in agreement with the idea that the higher engineering institutes should be Imperial. Would the provincial Governments in which these institutions are

situated retain some kind of connection with them?—A. I suppose they might. It would not be impossible.

Q. Would it be a good thing entirely to divorce the United Provinces Government from all interest in the Roorkee College or the Bengal Government from all interest in the Sibpur College?—A. Certainly not from Sibpur as it now is.

Q. As it would be, if it were a civil engineering college?—A. The Local Government should certainly continue to take interest in the college. It might do so by means of a local committee. The institution would be a loser if the Local Government had no connection whatever with it.

Q. I do not want to raise the question as to the functions of the Director of Industries. I only want to ask you whether you would not agree that the Director of Industries should be at any rate responsible for all local demonstration work and the teaching of particular processes in particular industries—the teaching of actual processes without reference to general principles?—A. I agree entirely. I want the Director of Industries to have as much power as possible.

Q. That is to say, for instance, the teaching of the use of fly shuttle is purely a matter for the Director of Industries?—A. The Director of Public Instruction should have nothing to do with a matter of this kind.

Hon'ble Pandit M. M. Mahaviya.—Q. You remember this question of the effect of Government taking in graduates and other educated men into Government service was considered by the Education Committee of 1882?—A. Yes.

Q. And they pointed out that it had a great effect in promoting the spread of education?—A. Yes.

Q. What advantage would, in your opinion, be gained if the other system is adopted, namely if the Government should hold its own examination for admission to the public service?—A. It would set higher education free.

Q. Would it not at the same time check the spread of higher education?—A. Not necessarily. It might encourage it. I do not think you can say that the establishment of the higher civil service examination in England has in any way checked higher education in that country.

Q. It is not a fact of men who want to compete for the civil service examination in England go to the Universities for education, at least many of them?—A. Yes, a great many.

Q. You have a system here also of examinations for particular professions, the legal, engineering and medical?—A. The higher ranks of the legal, engineering and medical professions in Bengal are all approached *via* the University.

Q. Is there a separate examination for entering the medical professions held in England?—A. You need not go to the University at all. A very large number of people never go to the University.

Q. Medical men?—A. Yes, medical men.

Q. If then there was a special examination, for instance, a competitive examination for admission into the higher grades of the public service, the object you have in mind would be attained?—A. I think it would be a very great improvement.

Q. Was not a system of a competitive examination for the provincial executive service in force in this province for some years?—A. There was and it has been modified. I am not sure about the facts, but it has been modified. I believe, speaking subject to correction, that the authorities wanted to get more local representation. I fancy the system of nomination is more or less a local system. All the candidates nominated must be graduates or a very large number of them.

Q. That system of competitive examination did correspond to the system that you have for admission to the public service in England?—A. Not exactly.

Q. It was a competitive examination for the posts of deputy collectors?—A. Yes, I believe so.

Q. Certain qualifications were laid down?—A. Yes.

Q. And only those who possessed those qualifications could compete for the examination?—A. Yes.

Q. So it did correspond to the system of competitive examination that you have for the civil service in England?—A. Any one can compete for any civil service examination in England with a few special exceptions, such as the Diplomatic service and clerkships in the House of Lords. There is ordinarily no question of preliminary qualifications.

Q. In the place of that you now have only a system of nominations by different bodies who have been empowered to do so?—A. Something of that kind.

Q. There is no examination held now?—A. Not, I understand, for the Provincial Executive Service. There is one examination which is still held and that is the Finance Department Examination which is conducted by myself.

Q. Except so far as the Finance Department examination is concerned, the Government here have deliberately abandoned the system of competitive examination for the executive service and have substituted for it a system of selection, from among the graduates of the

University who have been recommended or nominated by certain bodies?—A. Yes. But the change was made some years ago. There has been an enormous expansion of education in Bengal since that happened.

Q. But is that the system now in force?—A. Yes.

Q. You have given us some figures from the report of the committee on education?—A. From certain notes that I have got from the Board of Education.

Q. Then we find in England that the best boys from the elementary schools do not go to the technical schools at present?—A. Yes. The statement refers specially to London, but I suppose that it is fairly typical.

Q. That is the case in England when there is a great deal of provision for imparting technical instruction there?—A. Yes.

Q. Since the Technical Education Act was passed many years ago?—A. There are now in England a large number of engineering schools, trade schools, technical institutes and polytechnics.

Q. It is not surprising then that in the absence of any system of technical instruction here you find our boys going largely into the University?—A. I consider that what has happened here is exactly what one ought to have expected would have happened.

Q. The remedy for it in your opinion is to introduce, in addition to a system of general primary education, a system of industrial education?—A. Yes. I have not worked that out.

Q. It is a fact that England has been more backward in the matter of systematised technical instruction than Germany?—A. Very much so. I do not think that people out here realise that.

Q. And therefore it is not much good asking us to go for a model to England for providing systematic technical instruction for our youths. Have you studied the system which is in force in Japan?—A. Not closely. I know something of the German system and the French system. I am not clear about the Japanese system.

Q. In the German system, am I right in saying that in addition to the elementary technical instruction they provide they have a system of higher technical schools in which very good and efficient technical instruction of the highest kind is provided?—A. Yes.

Q. Therefore if you have a system in which, in addition to general elementary education, you have elementary technical education provided and in addition technical education of the higher kind such as is given in the higher technical schools in Germany, that is likely to give a very decided turn to the minds of students in Bengal in favour of industrial work?—A. I think that unless you make it more difficult for a boy to approach the thing which he wants now, namely, the secondary school and the university, unless you make it more difficult for him and a little more expensive than it is now to go to a secondary school and then to a university it will be a very long time before he will go of his own choice into other lines.

Q. I understood you to say in answer to a question by the President that the standard prescribed for the degree examination here is quite as high as in England so far as the pass course went?—A. I say that the standard of any examination finally, and frequently before very long, adapts itself to the general intellectual level of the candidates who go up for it.

Q. In the Calcutta University you have been familiar with it for many years has the standard of education been lowered or has it been raised during the last twenty years?—A. It is rather difficult to say.

Q. What is your general impression?—A. My general impression is that the Matriculation standard has been lowered. That is a statement which is often questioned. Some people say that it is not so, but that the schools have improved. I say that the standard of Matriculation is deplorably low.

Q. In the matter of a knowledge of English or of other subjects?—A. English is very bad and other subjects are not good. The top classes of certain high schools in Bengal have recently been tested in arithmetic by one of my Inspectors by means of test cards which are given to children of 10 to 12 years of age in the Public Elementary schools in England. The average percentage of success in the high schools here was 33 per cent.

Q. Do you ascribe it to the standard being low or to bad teaching?—A. I ascribe it to bad teaching. In Bengal a number of schools have sprung up very quickly in response to the desire to compete at certain examinations. These schools have not got enough money. The teachers are paid starvation wages and they only exist by coaching their own pupils out of school.

Q. So far as the standard prescribed by the University is concerned, you have nothing to complain of?—A. The number of schools and the number of pupils have increased rapidly. The demand has outstripped the capacity to meet it efficiently. This in itself would tend to depress the standard.

Q. In the case of the B. A. and other degrees, the standard is not low but it is the teaching in the schools you complain of and you say that the boys go to the University less prepared than they should be?—A. I have had recently no personal experience of it in the colleges. I have no hesitation in saying that the standard of teaching in the secondary schools is deplorably low and that under the conditions under which the work is being attempted efficiency is impossible. The teacher is seldom trained, and even if he is, he cannot

possibly teach 50 boys at once, or generally work intelligently under the conditions under which he is forced to work.

Q. My point is this. You have said you have not compared recently the standards for the degree examinations and you have not been an examiner for some time. But I understand you to say that so far as the pass degree in England and here can be compared, the Indian degree compares favourably?—*A.* The pass degree in England of any residential University is not worth very much but it represents three years of systematised study in circumstances and in an environment which is out of comparison to anything which could be under existing conditions obtained in India.

Q. You have got in addition the honours course now?—*A.* Yes.

Q. And in addition to that, several students go up for a two-years course for the M.A. degree which you do not have in England?—*A.* Yes.

Q. Why do you suggest then that if you raise the standard of the degree examination and of the school final, it would be a proper alternative to attracting students to industrial lines?—*A.* My position is that too many students are attracted to the University courses.

Q. Because too many are attracted to the University, for that reason alone you would raise the standard higher?—*A.* I think that too many people are trying to follow the same careers.

Q. You have said that Bengal students love University educations. If you have higher technical education provided in the University, do you not think that without any raising of the standard of the Arts degree students will be drawn towards the technical side in large numbers?—*A.* The University degree in arts or science is of some value. There are openings for those who have secured university degrees even though the good openings are out of all proportion to the number of competitors for them. You cannot expect a man to go to a technical college, however high the standard of the institution, if he is going to be stranded afterwards.

Q. So far as the technological branch of study is concerned, don't you think there will be employment found for many a young man of University qualifications who went in for electrical engineering?—*A.* I have seen the matter discussed. There appear to be a good many openings for practical men.

Q. The man who has had practical experience in addition to University education?—*A.* Practical experience is indispensable. I don't consider that a University course is necessary or even desirable in every case. It depends on the capacity of the man and the sort of work which he is likely to have to handle.

Q. And also for mechanical engineers?—*A.* Yes.

Q. And industrial chemistry is also largely coming into play at present in Calcutta in the various mills?—*A.* Probably.

Q. For instance in the paper industry and the jute industry?—*A.* The fact remains that at the present time there are at least six chemists known to me who have done well in institutions in England and have had some practical training. They are all looking out for employment in the Education Department and all those who have not got it except one who has got some work in Tata's works are doing nothing.

Q. But, so far as you are aware are these European firms willing to take in Indian students who have passed in industrial chemistry?—*A.* I do not know. Apparently they are not willing to take in young Bengalees on the terms on which they wish to enter the firms. I have no definite information as to what terms if any they have been offered by those employers.

Q. You say "In many, if not in the bulk of cases, highly capitalised industry on European lines is not possible in this country"?—*A.* Yes.

Q. You did not have in your mind the cotton and the jute industry?—*A.* I meant local industries.

Q. You have advocated the apprentice system but you have also in one place condemned it?—*A.* I am not sure that what I have written is really contradictory. I am in favour of the system but am doubtful as to how far it is practicable.

Q. You say, "In a word, apprenticeship, in its true meaning, training by personal influence and imitation, will not suit the large industry." That is the conclusion you have come to. For training men for the large industry, you would require technical schools with workshops attached to them?—*A.* I suppose that they could be trained in the factories themselves.

Q. But you say that it is not suited for large industries?—*A.* The man who gets training in a factory is not necessarily an apprentice. By apprenticeship I mean a personal sort of relation between the craftsman and the pupil.

Q. From what you have heard do you think it is likely that our existing large industries will take in a large number of students as apprentices?—*A.* They are taking apprentices in the railway workshops and in the workshops of engineering firms.

Q. Would they be able to take in as many students as you would like to train for meeting the demands of our growing industries?—*A.* I think that the training which the workshops can give will have to be supplemented by a system of schools working in co-operation with the shops.

Q. Your experience of the artisan classes has been very unsatisfactory. You think that the boys do not stay. Don't you think that, if you improve the teaching, if you provide a better course which would have a market value, they would come more readily, even without scholarships or stipends?—A. Honestly with regard to the artisan schools of Bengal, I am absolutely at the end of my tether. They exist and we do not seem to be able to make any progress with them. As to what is wrong I am not quite sure. I have put down in my note certain difficulties which have occurred to me. A Director of Industries who could look into them from the point of view of the local industries might be able to do something. I can only tell you that at present they are not doing much good. There are not very many of them.

Q. You say "The ordinary Bengalee parent prefers to invest the capital in some less risky venture on behalf of his child." But are not industries and factories growing in Calcutta and around it?—A. Yes.

Q. But how much of the capital sunk in them came from Bengalees?—A. You don't see many factories in the mofussil.

Q. In and around Calcutta there is a great deal of employment available for trained artisans in the various mills?—A. Very little of this labour is Bengalee.

Q. In the jute mills, the Bengalees are not many?—A. Practically non-existent.

Q. In Jessop's works I understood there were many Bengalees employed?—A. Possibly. The steamers of Eastern Bengal are entirely run by Bengalee labour (*serangs*, engine room men, *mistries* and every one else). But these excellent men are not products of industrial schools.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. Suppose you got technical and commercial colleges as in Bombay do you think they would attract the intelligent class of students in Bengal?—A. Not to the same extent as in Bombay.

Q. Many of our boys who pass out of our technical college in Bombay go upcountry to the United Provinces, the Punjab and other places and in turn we have many students from upcountry?—A. The Vice-Principal of the Serampore school was till recently a Parsee.

Q. About the Director of Industries, do you think that he ought to be a business man or a service man?—A. It is a little hard to say until one knows what he is going to do. I do not suppose you are likely to secure the services of a very effective business man on a pay of Rs. 1,200 with a two years' probation.

Q. Do you think that the capitalists of Bengal who are now thinking of starting industries will be tempted to send their boys to the industrial schools if they are started instead of to the literary schools?—A. If there were openings in industry for Bengalees, whether trained in industrial schools or not, I am fairly sure they would try and take advantage of them. Whether the boys of this class would make good in industry or not is another question.

Sir D. J. Tata.—Q. Don't you think that the technical schools and other institutions of the kind which are advocated are a little too theoretical and much better work could be done by the factories themselves in training their own men for their own work?—A. My feeling is that probably the best results would be obtained by the Government working with the factories. I think that the scheme now under consideration the object of which is to link the Sibpur apprentice department with the training given in the railway workshops and other places is on the right lines.

Q. But if the factories themselves train the men they want for their own use, and give them a little technical education outside by night schools and things of that kind, would not that be a practical solution of the training up of people for particular classes of work? I am speaking from personal experience of the work we do in our cotton mills at Nagpur. We have a system of apprenticeship which has been in existence ever since the beginning of the mills which were started sometime in the seventies. We train up all the men we want from our works from the lowest to the highest department. We began by having Lancashire men; these men came out and taught everybody that we placed under them; they were bound to teach them all they knew and if they did not turn out satisfactory pupils they were liable to be sent away; in this way in a very short time we manned our mills entirely by Indian labour and did away with the imported skilled labour and every post right up to a manager was filled up by Indians trained under us. We found that very satisfactory. As a matter of fact, we find that men who have been apprentices with us and trained under us can always get appointments outside on double the wages that we can offer them in preference to the technical school men and men from the technical colleges because they are not practically trained in the ordinary work of spinning and weaving and all the other departments. Don't you think that it would be a better way of training up people if the factories themselves trained the men they wanted?—A. I think on the one side there is danger of the technical school being divorced from the real work done in the workshops and therefore it seems to me to be beyond dispute that somehow or other the school and the workshop have got to be brought close to each other. The danger of workers being trained only in the factories is that this system is apt to overlook the fact that the worker is not only a worker but that he is also a man and requires something more than mere technical training. Possibly that difficulty will not be felt in India for some little time yet but it will be felt later on. What is needed is that the factory and the technical school should work together.

Q. For all practical purposes we have found that the men we have trained give better satisfaction. We have tried technically trained men and they do not give us satisfaction because they have no practical knowledge?—*A.* The Eastern Bengal State Railway are not satisfied with the products of Sibpur. On the other hand they realise that the workers who have become employes of the Railway after undergoing the present system of apprenticeship in the shops can't go very far. They want to have a technical school at Kanchrapara and they want our assistance generally in connection with the general as opposed to the specific training of their apprentices by which the better qualified apprentices might take a course of instruction at Sibpur in supplement of their apprenticeship in the shops. Of course the dissatisfaction of the Railway authorities with their locally recruited worker is largely due to the fact that the boys who go into the workshops as apprentices go there with very low educational qualifications. All that I am suggesting is that your workers must have some intelligence in addition to mere mechanical skill. Your training will tell in the long run on the efficiency of the workers and consequently on the vitality of the industry.

Dr. E. Hopkinson.—*Q.* You stated in reply to a question of the President that there could be no development of industrial education without a much wider spread of primary education. That appears to me to be perfectly obvious, because industrial education cannot be imparted unless the students can read and write. Even an elementary mechanical drawing cannot be understood unless the students can read figures and tables. We have been told again and again by the manufacturers that they prefer to have boys who have had no primary education. They state that they make better workmen if they cannot read or write. Apparently the reason is that if they can read and write before going to the factory they get a bent of mind which develops in the wrong direction. A solution suggested by several manufacturers is that concurrently with work in the mills the boys should receive some primary education in schools attached to the mills. Has this method of the introduction of some system of manual training been discussed?—*A.* Everything has been discussed. In the present state of affairs in Bengal one cannot talk of a primary education system. The idea with which primary education is approached is that it will lead to something else. It is so bad that unless it is going to lead to something else the ordinary villager does not see any point in it and he is right. The primary school in Bengal is the first sieve in the selective agency but there is a large percentage of children who do not go to school. Those who touch the selective agency at all are apt to feel disinclined to settle down to their family avocations. They want to try and be something else, *e.g.*, clerks.

President.—*Q.* What could be the effect if you made primary education of the right kind compulsory?—*A.* I think it would solve the problem. Education is an unsettling influence so long as it is confined to the few. The demand for instruction in English in Bengal is largely due to the fact that such instruction is comparatively speaking difficult to secure. If English were open to all, the fact of its acquirement would become of no inherent value. In the artisan schools I find that very few pupils can understand a design at all. As regards the mills, the managers of the mills around Calcutta would not mind having a school in the mills compound but the reluctance comes from the people employed. They don't care about their children having this education. The position of the managers of the mills is a perfectly reasonable one. They cannot force education upon their coolies; if they tried to do so, the coolies would go away.

Dr. E. Hopkinson.—*Q.* I gather from you that in Bengal at any rate as soon as any one starts on an educational career he begins to get engulfed in a downward stream which ends in the Calcutta University?—*A.* He does not always get there but most boys have probably a hazy idea that they might get there with luck. Look at the entire collapse of the middle vernacular school: It is a school which teaches a stage beyond the primary school but gives no instruction in English. The Government of Eastern Bengal and Assam tried to organise these schools but they are ceasing to exist because nobody will go to them. What is wanted is a better school which teaches English but has a practical bent.

Q. I am not quite clear whether if industrial schools are started provincially, you consider they should be entirely under the control of the department of Public Instruction or not?—*A.* It would depend very largely on the form which these schools would take. It is not quite clear to me for example with reference to the various proposals which have been made, what the difference is between a demonstration factory and industrial school. I do not see very much difference except that the industrial school will probably throw in a little teaching in reading, writing and arithmetic. If the industrial school in Bengal is simply a workshop in which people do tinsmith's work or blacksmith's work and if that is going to be the form of the industrial school, I think it had better be under the Industries Department.

Q. Take two concrete examples, the School of Carpentry at Bareilly and the School at Lucknow?—*A.* It seems to me they are quite well off as they are. They have got very good men in charge of them and strong local committees and I do not think there would be any point in taking them away from their present system of control.

Q. It is not a question of altering the personnel but of the ultimate authority. Is it to be under the Department of Public Instruction or the Department of Industries?—*A.* When I was in London the Government of India referred this question to the Board of Education. I was strongly of opinion that the ultimate department must be the Department of Education, but out here since I have come back, I have found that a good many practical difficulties stand

in the way of what was formerly my ideal. I find also that it is very difficult to divorce this question from the much larger question what sort of shape the Education Department is going to take.

President.—*Q.* What we were told was if they taught merely handicraft they might be under the Director of Industries, but if in addition to it, they taught drawing and mathematics they should come under the Director of Public Instruction?—*A.* I think on the whole, speaking from my experience of the last two or three years, that it would be better to have them under the Department of Industries. Otherwise there is a tendency to divorce them from actual industrial conditions.

Q. We have been told a great deal about the advantages of the system of education in Germany and Japan. Do you think there is any virtue from the educational point of view in elementary education being compulsory? Does it make a fundamental difference whether your elementary education is optional or compulsory. If it is optional, it leads to what you have described. If it is compulsory, would it prevent that result, and would it also be better for the boy from the educational point of view that he should be compelled to do something from the very beginning?—*A.* The answer to both the last questions is, I think, 'Yes'. Of course it is very difficult to say in a country like Bengal whether the fact of compulsory primary education would have any great effect on the general efficiency of the population. I think that eventually it would probably have such an effect.

Q. Bengal has the highest figures for primary education of all the provinces in the country and from the industrial point of view its figures are the most unsatisfactory, that is to say, with the greater industrial development of Bengal its people is taking a smaller part in its industries. How are these two facts connected? There are high figures for primary education and low figures for industrial employment. Is this due to the fact that primary education is optional and not compulsory?—*A.* I think it is due to that partly, and partly to the extreme ease with which a person can pass from a primary to a secondary school.

Hon'ble Pandit M. M. Malaviya.—*Q.* If you give an industrial turn by making manual work compulsory these things would be different. The technical and industrial education, we are talking of, would provide agricultural education for the agriculturists also. It would enable them to do better agriculture?—*A.* Yes. It would give them something to look to other than the secondary school.

Mr. C. E. Low.—*Q.* Is it not a fact that a great proportion of boys who undergo primary education in Bengal do not reach the secondary school?—*A.* Yes. And many who reach even the high school stage never get as far as the Matriculation. That is not because they do not want to.

Hon'ble Pandit M. M. Malaviya.—*Q.* Because they are poor?—*A.* Very largely and because they cannot get up to the standard.

Q. If the system is made compulsory for every boy between the ages of six to fourteen, you must have immensely better results?—*A.* Yes. You cannot call the present system of *pandits* a system of schools. That will disappear with the compulsory system.

Q. As regards the cost, would it not repay itself many times in the prosperity of the people and the growth of business in the country?—*A.* As to the cost, the nearest figure that has been worked was when the Government of India made enquiries as to what it would cost to make the primary education which was then being imparted free and the figure then given for the old province of Bengal was 30½ lakhs increasing in five years to nearly 64 lakhs. It would be a great deal more now for the Presidency of Bengal. For a long time elementary education was compulsory in England but not free.

Hon'ble Sir R. N. Mookerjee.—*Q.* You have a vast experience of the cultivators of the Bengal rural areas. A cultivator, if he has five sons, employs three of them in his own work. He cannot afford to let all the five to go to school?—*A.* Certainly the jute cultivator could easily afford to send all his sons to the nearest primary school, if he desired to do so.

Q. If there is compulsory education up to 14 years, would it not be a hardship to many of the cultivators to send all their boys to school?—*A.* It would cause difficulty in some cases.

Mr. A. Chatterton.—*Q.* In 1901 the Director of Public Instruction suggested a very elaborate system of manual training. What became of that?—*A.* A syllabus was drawn up. It did not really mean very much because there it was little use asking the unfortunate *pandit* to give a kindergarten lesson. The Education Department took away the old reading books and introduced science primers. The changes then introduced went on until about 1907 and then we revised the system and the present Western Bengal curriculum is the result. It is really almost beyond criticism but it does not work. We are always telling the *pandit* that he should stimulate the children into the free exercise of their natural activities but there is one teacher usually for five classes and he has not very much time for intensive culture.

Q. Is it in force in Bengal?—*A.* The main principles. We modified the science primers. I can send you a copy of the syllabus. It is like the Board of Education syllabus at home. It is in existence but not in force. During the period which intervened between the putting forth of Sir Alexander Pedler's syllabus and the revision in 1907 a committee was appointed to consider whether a specially simple course for rural schools should not be prepared. This committee suggested that there should be such a course but it was subsequently decided that there was not much to be gained by differentiating a rural from an urban primary school.

Neither of these institutions did in fact represent more than irreducible minimum. The syllabus for Western Bengal was then revised as a whole and a few remarks were added as to nature study and environment and all that. In the girls' schools where they have trained teachers sometimes quite wonderful work is done in the way of nature study.

Q. Talking of industrial education in Bengal, would you be in favour of making it legally compulsory that apprentices should enter into indentures and be compelled to fulfil the terms of their apprenticeship either in an industrial school or a factory?—A. I think it is necessary. It is difficult to dispense with the system and if it is not worked properly, it will not work at all.

Q. Can you give us the origin of these Bengal industrial schools?—A. Mr. Heator will tell you. My impression is that originally all the industrial schools were missionary institutions.

Q. From the information which you have, they are mostly employed in training artisans for the villages, and I should like to know whether you can express an opinion on the point; does the development of village life in Bengal require a higher standard of craftsmanship than that provided by the hereditary artisans?—A. My impression is that it does not. That is the chief difficulty.

Q. These schools are not fulfilling any useful functions?—A. One of the best schools that is the C. M. S. School near Krishnagar, does very good carpentry work indeed and it turns out work which is on a par with the work of European firms. Its aim is to train village boys to be village carpenters, but the boys of this school unless they subsequently get into the railway workshops or into the shops of some Calcutta firm are practically drags in the market. All that a village carpenter has to make is a rough wheel or something of the kind. That he could learn to do by watching his father at work. The work of this school is good because there is European supervision. The boys do come down to Calcutta and sometimes get good posts and they certainly get employment in the carriage factories of the Eastern Bengal Railway. My point is that as a school for the training of village carpenters it has little scope.

Q. In regard to the industrial schools, would you advocate the schools confining themselves to the training of artisans pursuing their particular trade, that is to say, if you have a weaving school, you would only admit weavers into the school whilst in a general industrial school you would only admit the sons of carpenters into the carpentry section?—A. I think I would.

Q. There appears to be no information available here as to whether these persons are in a decadent state or whether the number of artisans is not sufficient to meet the industrial requirements of the people?—A. You mean the village carpenters and the like.

Q. Not village carpenters so much as village weavers?—A. They always seem to be able to get plenty of students in the weaving school whether at Serampore or the branch schools. Mr. Hoogewerf tells me those students are able to earn more when they leave the schools.

Q. Do you think you would combine elementary education in the industrial school or would you rather restrict the industrial schools to boys who have already had a certain amount of primary education?—A. The latter course would be preferable.

Q. Going a step further, do you think it would be wise to abolish these industrial schools and start afresh?—A. We might very well abolish the industrial schools in Bengal—I mean thereby the small artisans schools—and it would have very little effect on any one. The institutions are few; the attendance is very intermittent and you very seldom find a boy who goes through the whole course.

Q. In regard to the general industrial question would you subscribe to the statement that what you want to do in the first instance is to create industries, that when the industries have been created and the demand has been set up for specially trained artisans for technically trained foremen and skilled managers, we should proceed to supply that?—Or do you think that we should have technical institutions turning out a large number of students who have picked up a knowledge of mechanics and so forth and then turn them out to try and find employment for themselves? So far as our experience goes, these technically trained students who have gone on scholarships to England, Japan and so forth and come back with a certain amount of knowledge have not been able to find employment or to create industries?—A. Is it fair to expect any one of that kind to create an industry? You can turn out any number of people with a knowledge of chemistry and engineering who would roam about Bengal without creating any single industry in 100 years.

Q. What object would be gained by attempting to create educational facilities before we get industries?—A. It is quite useless.

Q. That is to say, we should direct our attention more to the development of industries and to importation if necessary of the men to do that work before we begin to train a lot of men?—A. I think that is so.

Q. We have heard about the success of the Victoria Technical Institute, Bombay. It turns out a very large number of students and they get employment and many of them do extremely well because there is a large market in Bombay for such students. That does not exist to the same extent on this side of India?—A. Take the dyeing classes in Sibpur. Some

few students came to them but I suppose they did not derive any practical advantage from the course, for admissions very soon dwindled to nil.

Q. My point is this, you want to set up a dye factory before you start to teach the art of dyeing?—A. Yes.

Hon'ble Pandit M. M. Malavika.—Q. If you had many industries in the country in which dyeing is a necessary process, would it be better that you should have uninstructed uneducated workmen or that you should have men who have received some training in the principles of dyeing?—A. If you have got a dye industry it would certainly be better that you should have technically trained men.

Q. Would you subscribe to this statement of Mr. John Perrin? "The manufacturing country that depends upon a few good managers and an army of unintelligent slaves will fall as the Roman Empire fell"?—A. Yes.

WITNESS No. 116.

Mr. B. Heaton.

MR. B. HEATON, Principal, Civil Engineering College, Sibpur.

WRITTEN EVIDENCE.

Introduction.

Civil Engineering
College, Sibpur.

The Civil Engineering College of which I am in charge has two main departments.

I.—*The Engineer Department*—in which instruction is provided to prepare students for the Bachelor of Engineering degree (civil engineering) of the Calcutta University.

Students trained in this department are employed in the civil engineering departments of Government, District Boards, and Municipalities as officers and upper subordinates, while others are contractors.

Civil engineering, except so far as regards the construction of docks, railways, canals, roads and buildings, has little to do with industrial development.

II.—*The Apprentices Department.*

In this department there are four courses of instruction—

- (1) The sub-overseer or lower subordinate course preparing lads for sub-overseer posts in civil engineering. This course acts as a feeder to the following 3 courses.
- (2) The (civil) upper subordinates course preparing for upper subordinate posts in civil engineering.
- (3) The mechanical and electrical engineering course preparing lads for employment as mechanical and electrical engineers.
- (4) The mining diploma course (started in 1906). These last 2 are the most important as regards the industries of the country.

System of affiliated technical and industrial schools.

It has been noted above that the *sub-overseer classes* have been utilised as feeders to the (civil) upper subordinate, the mechanical and electrical engineering and the mining courses.

There were many minor technical schools existing in different districts of Bengal offering classes for the training of low grade surveyors and low grade men of the sub-overseer type and possessing workshops also for training carpenters, blacksmiths and in some cases tin smiths. These were under no definite control or regular inspection on behalf of Government and in 1891 my predecessor Mr. J. S. Slater was deputed to visit them and to make proposals for their control. He devised a scheme whereby the better schools became feeders to the Sibpur College. They taught the sub-overseer course and sent their lads up to Sibpur for examination by the Sibpur standard. Their artisans too could be admitted to Sibpur for advanced training. Machinery is manufactured at Sibpur cheaply for affiliated technical and industrial schools.

Lads who passed were to be allowed admission to the higher classes at Sibpur. At that time only the old combined upper subordinate course existed and lads could be trained for the old upper subordinate and foreman mechanic's certificate, some specialising in electrical engineering. The main idea underlying this scheme was that technical schools

Note.—The mechanical and electrical engineering course on its present lines is quite a recent departure. There have been only 2 batches of lads who have completed the present course. Previous to 1912 the civil upper subordinate and the mechanical and electrical engineering students were taught together and special instruction in electrical engineering was given only during the year of practical training that follows the final examination.

The present 2 special courses were introduced in 1912 with the object of improving the quality of both the civil and mechanical and electrical overseers trained at Sibpur.

As this scheme developed in 1899 the school at Bankipur was raised to the full Sibpur standard in civil engineering under the title the Behar School of Engineering.

The full scheme eventually became as follows :—

Each have artisan classes in carpentry, smithy, pattern-making, foundry work and motor driver mechanic at Bankipur.

Each of these major institutions has in turn become the head institution of a province, so that both Eastern Bengal and Assam and Bihar and Orissa, when they were formed found themselves with a definite system of technical and industrial education.

Minor Institutions . . .	{	Burdwan—Sub-overseer and artisan classes.
		Midnapur—(Sub-overseer closed) Artisan classes.
		Rajshahi—Sub-overseer and artisan classes (Sub-overseer class will close).
		Pubna—Sub-overseer and artisan classes.
		Barisal—(Sub-overseer classes closed) Artisan classes.
		Comilla—(" " " ")
		Victoria School " " { Sub-overseer classes for " European
		Geothals School . { lads, no artisan classes. Closed.
		Kalimpong—Sub-overseer classes for Europeans closed.
		<i>In Bihar and Orissa.</i>
		Ranchi—Sub-overseer classes and artisan classes.

In Bihar and Orissa.

I attribute the failure to be due entirely to the want of industries in Bengal and to the desire of Bengali parents to obtain service for their sons with prospects of a pension. Although we have offered at Sibpur courses in mining and in mechanical and electrical engineering to lads who have passed the sub-overseer standard, practically every Bengali has clamoured for admission to the civil upper subordinate classes and this preference has become more marked since we separated the mechanical and electrical from the civil overseer course. The result has been two fold—

- (a) An over production of civil upper subordinates.
- (b) That other means of recruiting for the mining and mechanical and electrical engineering course have had to be found, that is, a special preparatory class has been started for these courses only.

The system of instruction followed at Sibpur in all departments *has been as practical as possible.*

His method of learning is expressed by the Bengali English word "by heart." Knowledge thus apparently acquired easily evaporates. If you have learned how to use a

hammer and chisel how to weld a piece of iron, that knowledge cannot evaporate. The same way knowledge gained through experiment in the laboratory will remain whereas the same facts "by hearted" from a text book are never absorbed and moreover in this latter case we do not know that they have been understood, even though the arguments are reproduced in an examination paper.

At Sibpur in every junior class 3 hours daily are devoted to work either in the workshops or laboratories. In the senior classes more time is given to the drawing hall.

I do not think that most Bengali lads approve of these methods of instruction especially those that join us after passing the intermediate arts or science examination and are more fixed on their "by hearting" methods.

The Bengalis who come to the college for training have seldom been educated with the intention of becoming engineers. This may be because the facilities for training engineers are limited, but chiefly I think because the profession does not appeal to the average Bengali. Students apply for admission to a great number of colleges and join where they can. Those that join the university classes at Sibpur have in the majority of cases failed to obtain admission to the medical or to another college.

The schools that prepare students for the matriculation, teach a lad the minimum number of subjects needed to pass that test, none of them attempt to prepare lads to study engineering. There are no facilities for learning drawing, carpentry or science; few candidates for admission to Sibpur have taken additional mathematics or mechanics. The lad that joins Sibpur from a Bengali school has not had the same chances of fitting himself to join an engineering college as a public school lad in England. Regarding the general remarks just made we may note that at some Government schools arrangements were made in 1901 to offer a choice of studies in the two higher classes; what we call B. classes were started; here drawing, science, surveying and manual training were taught.

The total number of students appearing at the B. final examination (conducted by Government at the same stage as the matriculation) is now only 46 from 8 schools as compared to a maximum in 1912 of 133 from 12 schools.

Lads who pass the B. final are permitted to join the 2nd year class of the sub-overseer examination, whereas matriculates join the 1st year class. The university recognises the examination but demands that a lad shall qualify in a second language before admission to a college. They give him no credit for his proficiency in drawing, science or manual training. This may to some extent account for the want of popularity of these B. classes.

The governing body of the Civil Engineering College are now further considering the question of the recruitment of students for the mining and the mechanical and electrical engineering classes at Sibpur.

Mining classes.

With reference to the mining classes a report has been written by Messrs. Adams, Glen George and Robertson, advocating a closer connection with the coal fields and suggesting that as it is difficult for lads to get in touch with colliery managers to undergo apprenticeship, it is better to recruit direct to Sibpur and to arrange for students to undergo an apprenticeship on a mine after completing a short course at the college and that they should come back afterwards to complete their special college training in mining.

Mechanical and electrical engineering.

A report is under preparation by Messrs. Hornell, Adams, Harnett and Heaton, which suggests a connection between the mechanical and electrical engineering classes at Sibpur and the apprentices under training in railway and commercial shops in the presidency. It is thought that if picked lads be taken into the college after having completed four years of an apprentice course satisfactorily they will be of more immediate value to employes on passing out of Sibpur than those who have only been through a college course.

One great advantage of such a scheme is that we shall recruit through it only lads who have grit and who are definitely committed to the profession of mechanical engineering, and it is probable that we shall turn out a greater number of those who will eventually succeed.

At present by direct recruiting I admit many lads who are wanting in determination. From 33 to 50 per cent. of those admitted do not reach their second year; they leave because they don't like work in the shops or for other similar reasons and the time, expense and trouble in training them has been lost to the country.

We propose to continue to make direct admissions to the college, as well as from these workshop apprentices. As the college now stands with its future still undefined, whether it will remain where it is, or be split up into a technological institute in Calcutta, and a school of mines at Dhanbad and a civil engineering college at Dacca we cannot expect any large development at Sibpur. We need an immediate increase in both class rooms and residential accommodation. The class rooms are insufficient in number, it is necessary to teach certain common subjects like mathematics and science to civil, mechanical and electrical and mining students together, they cannot be split it into batches so that if 60 be the maximum number that can be seated in one room, I can only take in 20 to study in each of the 3 branches, or a total of 60 in all.

If I take in 20 to study mechanical and electrical engineering these 20 should be determined to stay and be recruited of the best material available. I hope therefore to be able to fill up with a large proportion of apprentices from railway and other shops.

Besides my duties in connection with the purely professional classes at the Sibpur College I have had certain experience of industrial education.

I.—At the Sibpur College.

- (a) We had agricultural classes from 1897 to 1908 when they were removed to the Sabour Agricultural College. The Sibpur classes were not a success because guaranteed posts of deputy magistrate and sub-deputy magistrate were offered yearly as a bait to attract the "bhadralog." The bait was far more attractive than the study of agriculture and helped to fill the classes with the wrong sort of student, though doubtless producing excellent magistrates. Practically all students who attended were seekers for employment under Government.
- (b) We have had classes in dyeing from 1910 to 1916. In 1906 I put forward proposals in collaboration with Dr. Watson for classes offering a training to fit lads for work in connection with industrial chemistry, these proposals were limited by Government to bleaching and dyeing. The classes have not been a success, probably because the cotton mill industry is not so extensively developed in Bengal as in Madras, Bombay and in the Central Provinces. Two years ago I failed to obtain any suitable Bengali candidates for admission and on reporting the matter I was instructed to try to keep the class going by getting students from other provinces. I received that year in all 11 applications only 3 of whom joined the college. For the present session I received only 3 applications; 2 were of poor calibre for whom an artisan training might suffice. As in the previous year only 3 materialised out of 11. I might expect one at the most out of 3. On reporting the matter I was instructed to close the classes. They would have come to an end the following year any how as the Secretary of State had only sanctioned them as an experimental measure till the end of the 1916-1917 session.

An interesting point occurred in connection with these dyeing classes. The professor of dyeing urged me to try to affiliate the classes to the Calcutta University urging that if we could offer a B.Sc. degree in tinctorial chemistry we would get plenty of students.

I opposed this as it is no good holding out such a bait if no employment could be found.

Moreover I do not consider that a cumbersome body like the Calcutta University is the best controlling body for industrial education. Such is best given in the closest connection with industries and the controlling body should be mainly composed of manufacturers who have a direct interest in the training of the student in view of their future employment and whose active co-operation is essential.

I can't imagine busy manufacturers having the time to give to university matters or the patience to attend the interminable and inconclusive discussions on the Senate or Syndicate, discussions which are largely concerned with educational problems of an entirely different nature.

- (c) *Workshop artisan classes.*—We have useful classes of this nature in the Civil Engineering College shops.

We take lads, mainly the sons of mistries for training in carpentry, smithy, fitting turning and foundry work, and we give them instruction in trade drawing.

The full course is a 5-year course. As there is a great demand for labour around Calcutta many lads want to leave as soon as they have learnt the use of their tools.

If they leave at this stage they may never become really expert. To induce them to remain we offer them stipends varying from Rs. 3 in the 1st year to a maximum of Rs. 10 and at the same time we credit them every month with half the value of the labour they have put into their work; this is allowed to accumulate and lads on leaving occasionally draw from Rs. 300 to Rs. 400 from this source.

II.—Outside the Sibpur College.

I am Secretary of the Mining Education Advisory Board of Bengal and Bihar and Orissa to whom is entrusted the control of evening classes for mine assistants in the coalfields of these provinces. The object of these lectures is to direct the reading of assistants and to help to qualify them to pass the colliery managers examinations.

- (a) *English lectures.*

A full time instructor, Mr. H. C. Read, is employed, he lectures once weekly at each of the following centres:—

in Bengal:—Raniganj, Deshagurh, Charanpur;
in Behar and Orissa:—Sijua, Jherria.

The lectures take place from September to April when an examination is held, on the results of which certificates are given. This last year Mr. Read has started classes in the elements of surveying during the other months.

(b) *Vernacular lectures.*

A start has been made in giving instruction in the vernacular to the Bengali and Hindi speaking employes of the collieries.

Bengali lectures have been given in the last two cold weather seasons and Hindi for one season only.

These promise well.

Previous to 1910 I was ex-officio Inspector of Affiliated Technical Schools, but this work was taken from me on the appointment of the Superintendent of Industries.

Apprenticeship
system.

I do not believe in industrial classes run by Government at technical schools in mofussil districts; they cannot be properly controlled from Calcutta. It is extremely difficult to induce local authorities to take an active interest in them, or to place any orders with them for work. The training is generally limited to carpentry and blacksmiths' work though sometimes tinsmiths' work is also taught. The mistry teachers of these schools are often of poor calibre, far better results would be obtained by apprenticing lads to commercial workshops and arranging for some instruction in drawing. Workshops are the natural schools for industry. The managers are vitally interested in improving the skill of their labourers. So far as artisan training is concerned managers should be encouraged to admit artisans for training and provided that proper arrangements are made for the teaching of trade drawing they should be given assistance by Government in the form of a capitation grant.

Industrial schools.

I am of opinion that industrial schools should be under the control of a Department of Industries, they need a far closer contact with industries than with schools, and though doubtless it is necessary that in some industries instruction should be provided for drawing and design of a trade description, I think that this should be given by men employed in the trade who can explain its technicalities and application rather than by teachers employed by the Education Department who have no direct knowledge or interest in industry.

The Department of Education should have no voice in the control of industrial schools; they cannot judge results; and it is results that you look for in industrial education.

The ordinary Inspectors of the Education Department will not have the necessary knowledge or training and their influence would tend to make the artisan training lose touch with industrial conditions.

Training of super-
visors and of skilled
managers.

The training of supervisors can only be undertaken in workshops. Such men must have a practical knowledge of engines and machinery; they must be familiar with the conditions of work in shops and must be able to control labour.

They are best trained through apprenticeship in large workshops where there is an adequate foreman staff and they can be properly looked after; they should be compelled to attend daily for technical instruction at a properly staffed and equipped mechanics' institute.

Here the bulk of them will be trained as mechanics and they will eventually become foreman mechanics capable of taking charge of a section of a large workshop or a minor industrial shop.

The cleverer lads will soon come to the front during apprenticeship and arrangements should be made to enable these to finish off their education by joining a well equipped and well-staffed college for more advanced training in theories and in laboratory work which cannot well be arranged at the mechanics' institutes they attend during their workshop apprenticeship.

A scheme putting forward such proposals is under preparation for the governing body of the Civil Engineering College.

We do not propose to confine the college training to lads who have been through workshops; we propose to admit a certain number of lads direct to the college classes and to give them their full diploma only after the satisfactory completion of a further 3 years period of apprenticeship. The two methods of training should go side by side.

The type of Indian whom we should now attempt to train in India for industrial enterprise is the assistant manager or foreman; the better of these will doubtless rise to be managers. They are best trained through the school of practical experience accompanied by a modicum of work at college to enable them to understand the theories.

The university type of man, namely a man who takes his scientific training before he has acquired any practical knowledge of the profession he intends to follow, is a dangerous type to produce.

He is apt to think on the conclusion of his college course that he is qualified to occupy the higher posts and even to pose as a consulting engineer. Unfortunately public opinion in India does not even yet discriminate between the practical man and the newly fledged theoretical college student, consequently there is a tendency to put immature college trained lads into posts where a practical man is needed; this is fair to neither. Students too on

the completion of their college training, in their pride of intellect, expect employment in the office chair of a man who directs ; they are impatient when it is pointed out to them that they have no practical experience and so little conceive what real practical experience of the profession is that they claim that practical instruction in college workshops and laboratories is an equivalent.

Recently a Bengali student immediately after obtaining his degree and before qualifying for the full college diploma was appointed a director of an industrial concern and actually demanded that the experience he might there acquire should be accepted as an equivalent to the period of practical training prescribed for a civil engineer's diploma.

The university type of man can be trained just as well in India as in Europe and at a smaller per capita cost to Government. Such a man may be sent to England for a period of practical training afterwards to fit him to begin to climb the ladder of his profession. But he must be prepared to go through the drudgery on his return. Englishmen have for years had to undergo long periods of apprenticeship after their university course and these are content to begin at the bottom of the ladder in England. Indians must be prepared to learn their profession just as thoroughly before they are competent to occupy posts of trust, especially those in nascent industries run with other people's money.

It will be quite possible to provide adequate university courses of training in India at probably no greater a cost to the public purse than is now incurred.

We have four engineering colleges of university rank : The Thomason College, Roorkee, the Civil Engineering College, Sibpur, the College of Engineering, Madras, and the Engineering College, Poona. The university classes of these colleges turn out at present only civil engineers.

It should be possible to retain college one for civil engineering only and convert the others into mechanical and electrical engineering colleges and into mining colleges where facilities could be offered for advanced courses of a university type.

These colleges all possess professors of mechanical and electrical engineering and have good equipment ; by "pooling" the existing resources and by adopting a system of federation amongst these colleges we should be able to institute advanced university courses without any further charge on the public funds.

The colleges should be put under an Imperial Department as they will each have an Imperial outlook instead of their present provincial point of view.

The courses of instruction should be laid down by a Board of Control. The first 2 year courses may be given at all the colleges. After passing an examination held at the end of that period, students should be able to go to one college for a special course in civil engineering, to another for mining, to a third for mechanical and electrical engineering. It would be easy to add on a special extra course in, say municipal and sanitary engineering open to the whole of India.

The colleges would for the present retain their recruiting areas — Sibpur for Bengal, Assam, Burma and Bihar and Orissa ; Roorkee for the United Provinces, the Punjab ; Bombay for Bombay and the Central Provinces ; Madras for Madras.

It would be easy for Burma to obtain the full benefit of such a scheme by starting at Insein or elsewhere a college offering merely the first 2 years of the prescribed course common to all the branches of engineering ; the cost would be trifling. The larger independent States too might make similar arrangements.

Under the present conditions each province is expected to make its own arrangement for all higher training, either in the province or by arrangement with another province or by scholarships to England—a very unsatisfactory state of affairs that puts the maximum of obstacles in the way of an enterprising student.

If the engineering colleges were placed under an Imperial Department far greater use could be made of them as centres for higher industrial training. Compare the Forest Institute at Dehra Dun.

They will each be well equipped with workshops and laboratories and with a highly skilled staff. Special industrial courses offered would be open in the natural course of events to the whole of India. Each college would know exactly what each other college was doing (at present they do not) and each college would become a natural advertising agent for all the engineering and industrial courses wherever offered. People would have a ready means of informing themselves in regard to all courses.

I have no experience of industry other than that concerned with industrial education. I believe that it is advisable that there should be some sort of co-ordination of effort between the provinces. Industrial education.

I do not believe that Provincial Governments keep themselves fully informed of the experiments in the way of industrial education that are being made by other provinces.

For instance there is in my opinion room for a dyeing class in India. Bengal made the effort. So far as other provinces were concerned there was no attempt at co-operation.

Though dyers are I believe needed in greater numbers in Bombay and Madras, those Governments did nothing practical in the way of supporting the Bengal classes and it is quite conceivable that they would rather initiate classes of their own, than support those

in Bengal. They could have offered scholarships to enable lads to attend the Bengal classes. The experience gained in Bengal through these classes is practically lost to India.

As the provincial outlook is limited to the province and the provinces have no official right to concern themselves with the needs of other provinces some co-ordinating authority is needed to see that small classes of this nature have a fair chance and are not unduly multiplied. If a Provincial Government puts forward a scheme for a class that would have better chances of success elsewhere, they should not be allowed to start it but some one should see that they give assistance to a similar class started elsewhere.

To allow too many similar classes to be started is unwise; it means that each may be unsuccessful when one class would be a success; but that class should be opened to all India.

There is a danger of a Provincial Government taking a too provincial view where an Imperial outlook is needed; for instance, shortly after a question was asked in the House of Commons regarding the existence of facilities for mining instruction in India, the Government of India addressed the Government of Bengal on the question.

Schemes for mining classes were sanctioned at the Sibpur College and I was granted permission to tour round India with a view to finding out how admission to these classes could best be arranged of lads from other parts. On my return I submitted a scheme, and in sanctioning it I was told that I must not admit any outside student to the exclusion of a Bengali. This effectually prevented any being taken from outside Bengal. I could not know till the actual last day of admission if I would have a vacancy and then it is too late to correspond. Besides one must be prepared to give a definite yes or no to distant students or firms; one can't keep them on tenterhooks. It would be as easy to run an Imperial School of Mines as it is to run the Imperial Forest College at Dehra Dun.

Industries must be run locally and with them goes artisan education.

Higher industrial education may be run imperially and associated with research.

It does not do to divorce education entirely from research. If you cannot associate a professor with the practice of his profession as in medicine, you must allow him to keep his intellect alive with research.

ORAL EVIDENCE, 7TH DECEMBER 1916.

President.—Q. About this scheme of yours for an Imperial technological college, could you give us an idea of the subjects you would take there specially, or if you would propose a separate one for mining another for civil engineering, and one for other groups of engineering?—A. Before the Public Services Commission I was asked exactly the same question, and I replied, one general technical university embracing all branches of engineering would be ideal, but I thought it would hardly be within the range of practical politics, and they suggested that we might proceed with some sort of scheme of federation of the existing engineering colleges. We might retain our present engineering colleges, with our present recruiting areas; then have the first two years of instruction common to all branches of engineering. After the student has passed his examination tests at the end of that period, he should be allowed to proceed either to one college to specialise in civil engineering or electrical or mining. My idea is that a scheme of that sort could be introduced with very little cost, but I would far prefer to have one general technical university embracing all branches of engineering, which would prevent any college getting at all narrow.

Q. You would have something like the Imperial College of Science and Technology?—A. Yes.

Q. What standard of admission would you adopt?—A. I should adopt the Intermediate Science standard of the Calcutta University. You cannot adopt a very rigid standard of admission in India because we have to consider both the admission of Indians and of Europeans, and there are so many various standards that you have got to take into account when making admissions, that it is rather difficult to lay down any special standard. You have to teach at the engineering college a good many subjects that you perhaps have not to teach in engineering colleges in England. You have to teach drawing from the very elements. The majority of students who are supposed to know something of science have not even handled a test tube, and have not had any practical test in science at the intermediate examination of the Calcutta University.

Q. Indirectly would that have the effect of modifying the standard adopted for the intermediate science examination in India?—A. No, the trouble is, if you take the Sibpur College as we are now; my present recruiting area for university education is Assam, Bengal, Burma and Behar and Orissa. Any student of these provinces who wishes to be trained for an assistant engineer's post in the Public Works Department, has to come to Sibpur, i.e., there is one engineering college for 100 million inhabitants. I don't know how many arts and science colleges there may be in that particular area. The recruiting area is so great and the number of admissions so small—about 24 every year—that it will be impossible for every college to set up a proper training class for admission here, and you have therefore to take the standards as you find them.

Q. Supposing it was one compound technical institution, would you allow it to have power to grant its own degree?—A. Certainly.

Q. Would you prefer degrees or diplomas of the college?—A. A degree would more probably attract a certain type of student. A college diploma—if it gives the authorities of the college a greater amount of control over the course of instruction and examination—is more preferable to a degree.

Q. Taking into account the fact that the atmosphere of industry is valuable to the student, would it pay to have a separate school of mining, apart from that big technological college?—A. Well, I think it would. The other day we were having a meeting of the Mining Education Advisory Board, and we asked one of our mining representatives what number of men, as assistant managers, he thought would be absorbed every year. He told me about 40 to 60 if the coal-fields are fully developed and the requirements of the Mines Act as to certificated managers fully met. If we assume that half of those were to be college-trained men and the other half practical men, who had trained in the mines, the organised college to turn out about 30 diploma holders here would be a very big thing. You would have to admit 75 or 80 the first year to start with. There would be ample scope for two institutions, one of the university type and one of the practical type run by the mine and acting as feeders or independently.

Q. Assuming that there is justification for setting up an independent institution for mining, are there any sub-divisions of engineering that might be split off in this way for independent treatment, especially having regard to the fact that you would then get an industrial atmosphere which would be conducive to good teaching? Mechanical, electrical and civil engineering?—A. It is much easier to get a proper atmosphere for electrical than for civil engineering. All the machinery may be concentrated within the four walls of a building. In civil engineering our examples must be sought for all over the face of the country.

Q. Would this institution have any dealings with pure science, or rather would it treat pure science as equivalent to a form of technology in its professorial staff and its facilities for research work?—A. If we could get the students who had a sound training in science to start with, there would be no necessity to duplicate training, but at the present time at Sibpur, although we get students who pass the intermediate science examination of the Calcutta University, from the very fact of his having had no laboratory work at all in science, we have to cover a considerable portion of the ground before they are of much use to us. It is rather difficult to imagine what might be the condition in future.

Q. Would it not be better then to make this practically a post-graduate institution and admit no one except those who have passed the B. Sc. degree or an independent examination set up as a test?—A. My experience of Sibpur is this. I have admitted 25 to 30 students who have been B. Sc.'s and those students have a better grip of science than I. Sc.'s. From a student's point of view, the Bachelor course in science lasts 4 years after the matriculation; and to have to put in another 4 years to complete the course in Bachelor of Engineering course is rather a long time. That is the real trouble.

Q. The man who would go through this college would either be fit for nothing, or fit for the best post. Surely if the training is worth anything it should be worth a higher class appointment in the Public Works Department or among firms?—A. I am not quite certain, students who come at the B. Sc. stage are more or less played out, it would be better to catch them at an earlier stage. B. Sc.'s have got more into a definite groove than I. Sc.'s, but if we could give the science training a more practical trend and introduce laboratory training from the very start at Science colleges and insist upon a really good course of science, it would simplify matters.

Q. Could you take them in the earlier stages and give them 5 years' training instead of three? Are you contemplating the practical training to follow, or to come in between?—A. I would like it to come in between the elementary and advanced stages. I think you could give it in 5 years; you could turn out a very good article in 5 years.

Q. You don't turn out a doctor in less than 5 years, why an engineer or an industrial chemist?—A. When I was in America, Colleges were saying they wished they could have their students for 5 years.

Q. Under the British law no one is allowed to practice medicine under 5 years' training, yet they have established B. Sc. degrees with a 3 years' course. Do you think there is any hope of turning out a good technical man under 5 years?—A. I don't think really there is. I think 5 years is a short course to turn out a good man.

Q. Would you then prefer the technological institute to adopt your intermediate standard as an entrance test, followed by a 5 years' course, one year of which at least should consist of practical training in a workshop; do you think that would produce good men?—A. That is what we have now. I have a 5 years' course at Sibpur, 4 years' for the B. E. followed by one year's practical training, and I would like to increase the time beyond 4 years.

Q. Your work is diluted to some extent by several other kinds of classes and also your choice is limited to the one province, or at any rate to the Eastern provinces, so that your field of choice in candidates for admission is small. The prospects offered to the man afterwards are limited, and your training of the higher class man is diluted by the training of other classes. Do you expect success under those circumstances?—A. No, we don't, we are turning out more B. Es than the country can absorb.

Q. You recollect the classes that were established for evening work on the coal fields under Mr. Griffiths somewhere about 1906. According to the figures that I have seen of those who have passed the examinations for mine managers',

certificates, most of these men have been trained in evening classes. The next largest group came from Sibpur, and last of all about 2 or 3 out of the 18 scholars who were sent with State scholarships to Europe. Do you think that an increase in evening classes would do as much good as a mining class in Sibpur?—A. I don't see how you could substitute a mining class. The point that I see is that it is a matter of recruiting students to be trained. Students will come very readily to the college, and parents will allow boys to come to a college where they are looked after. It is very easy for me to recruit any number of students every year. It would be far easier for them to come to me than for any of them to make arrangements with individual mine managers.

Q. You serve supplementary purposes?—A. Yes.

Q. Your men when they leave college, do they readily get posts as assistant managers?—A. They are snapped up before their training is finished. Last year we had more applications than we could deal with.

Q. Do they get good pay?—A. After they get the manager's certificate they do very well. They begin on Rs. 150.

Q. How soon after they leave you do they get their certificate, as a rule?—A. Nominally one year, practically one year and eight months. At the last examination I think 80 per cent. of the successful men were from Sibpur.

Hon'ble Pandit M. M. Malaviya.—Q. Having regard to the distances of the different provinces, do you think that one central institution for imparting higher training in engineering would be sufficient for the whole country?—A. As a start.

Q. Don't you think that each major province, such as Bengal, Burma, Madras, Bombay, the United Provinces and the Punjab, is large enough to require provision for the highest kind of engineering education within its own area?—A. Not in all branches. I have the greatest difficulty in getting suitable employment for the 13 F.E.'s I turn out every year.

Q. You know the practice of Roorkee; they have a larger number of students?—A. Their position is entirely different. The Roorkee College is bolstered up with guarantees.

Q. There are only six appointments guaranteed?—A. Six out of 20 admissions means that in the final class there may be 10 or 12. Practically every boy who passes there either will get immediately an appointment as assistant engineer, or be employed by somebody in a similar position. Sibpur passes out an average of 13 every year, for only one guaranteed post. The remainder look for positions elsewhere and generally to the overseer grade of the Public Works Department. They are not trained to be overseers; they are trained to be masters.

Q. What salary do they get in the overseer grade?—A. Rs. 100 to 120.

Q. What is their salary when they find employment under the District Board?—A. They begin at Rs. 60 or 80.

Q. How many of your students rise to be executive engineers; do any?—A. Yes, I could not say what percentage exactly, but we have this one guaranteed post every year in the Public Works Department, and in course of years everyone of those boys has a chance of rising to be an executive engineer. It only means sticking to their work. I want you to understand, if you are thinking of comparing Sibpur with Roorkee, that at Sibpur we did not start till 1880, and it is not fair to make the comparison. If we had started at the same time as Roorkee, you probably would not hear so much about Roorkee. They got their privileged position straight away, and we are trying to compete with them.

Q. So far as the standard is concerned, your standard is not lower?—A. It is higher, and I have a better qualified teaching staff.

Q. I understand that you began the other branches of engineering, electrical and mechanical, only two years ago?—A. We have been teaching electrical engineering for about sixteen years or eighteen years, but we were then teaching a general class sort of engineering. As you saw, the workshops form the backbone of our training, and we were then training a general engineer who was both civil and mechanical. After he finished his college course we gave him a special training in our Electrical Department, we have a considerable reputation for our electrical engineers, and have no trouble in getting employment for them.

Q. How does your standard now compare with the standard of the Imperial College of Science and Technology at South Kensington?—A. Ours is more specially for India, and I should say that they are higher than we are. They must be higher. We are not trying to give a very high theoretical training; we are trying to turn out practical men who will be useful supervisors. Our aim is somewhat different to that of the College of Science and Technology.

Q. You do not aim as high as they do?—A. Not in theory.

Q. You don't think there will be any difficulty in raising your standard to that of the Imperial College at South Kensington? It is only a question of employing more staff?—A. And we would probably have to modify the course and give a higher training in mathematics.

Q. Then you think that one institute will be sufficient to meet the requirements of higher education for the whole country?—A. Of the type of education we have in the Sibpur Apprentice

Department you can have one in each of the provinces, but of the university type one would be quite sufficient for many a year.

Q. You do not then advocate the abolition of the colleges that exist, but you want something better to crown them?—A. Yes. You will have to abolish the university classes as they exist, but we ought to have courses everywhere of the upper subordinate type training practical men. The university classes will have to be closed and centralised somewhere.

Q. Is it not wrong for an institute to have lower classes attached to higher classes?—A. It is much better not.

Q. What does the lower subordinate sub-overseer get?—A. The salary ranges from Rs. 55 per month to about Rs. 80, but you find the District Boards and municipalities have men whom they call overseers to whom they offer as little as Rs. 15 per month.

Q. Don't you think that that accounts for the fact that you don't get many students for the classes—the low emoluments?—A. It is only a two-years' course of training to qualify as sub-overseers.

Q. The students can probably earn as much without going through that course?—A. I don't know; I have been told that the value of my sub-overseer's certificate in the marriage market in Bengal equals that of the M. A., so it appears it must be attractive to them.

Q. I would not rely very much on that information. If you separate the school of mines from the technological institute would there not be a danger of your not attracting higher class students to the school of mines, whereas if you had a school of mines as part of the technological institute, are you not likely to attract a better type, the university type of students?—A. It would be some years before you actually started your special training of mining engineers. My opinion is that it is best to let matters evolve. I don't believe in a pure university course of theoretical training, which gives the student an inflated idea of his own knowledge.

Q. Could you not secure that by arranging your courses better, by insisting upon a portion of the time being spent in mines, and a portion in college?—A. We hope to do that, but directly you begin to associate any part of the institute with the workshops, or with mines, it is almost impossible to allow the university to control it.

Q. Supposing the proposed technological institute controls it?—A. Then so long as it is separate from any form of education, art, science, medicine or law; then you could do something.

Q. You have said that there is danger if you delay admitting students to your technological college; they might be played out by that time and may not be able to bring robust minds to the study of the different subjects?—A. Yes.

Q. You say that you attribute the failure of affiliated schools entirely to the want of industries in Bengal and to the desire of Bengali parents to obtain service for their sons with prospects of a pension?—A. Yes.

Q. But the number of appointments which carry a pension are limited, are they not?—A. Yes, but if you cross-question any student in class you will find that his guardian is looking for service for him either under Government or the District Board or the municipality.

Q. But they must very soon discover that not a quarter of them get such employment?—A. That particular batch will, but the batch of the following year won't know anything about it.

Q. Don't you think that parents are beginning to find out that they cannot obtain such appointments for all their sons?—A. They are beginning to find out.

Q. Don't you ascribe the desire of Bengali parents to look for service for their sons under Government or District or Municipal Boards partly to the absence of suitable instruction in technological institutions? That used to be the case in Germany between 1830 and 1840. If a man had 12 sons he would like his twelve sons to go in for Government employment, but all that has been changed since a system of technical education was instituted to provide new openings for them?—A. I regard it more as a question of employment than of an actual course of training. I don't think any guardian has any opinion of the course of training which his son is going through. He would be just as pleased with a bad form as a good form.

Q. In view of the industries—chemical industries, jute and paper industries, etc.—that exist at present, don't you think that there is enough room for employment for young men who may receive proper education and training in technology?—A. I thought you were alluding to the civil engineering side. These technical schools will train only for sub-overseers.

Q. You say that the Bengali student has a tendency more towards philosophy and the abstract ideas found in law. Don't you find that he delights to receive the technical instruction which he is receiving, for instance, in your college, and that he takes to it quite as eagerly as is philosophy or law?—A. When you have once wakened him up and made him take a proper standpoint with regard to training, he is as keen as anybody.

Q. You have had a number of B.Sc. students; did you find in their case that they were not sufficiently keen?—A. They are not so keen as the I.Sc. He is more ready to take to the workshop training than the older men. It is only a difference of two years, or may be three years.

Q. And you find that two years make a great deal of difference in the attitude of the men towards the workshops?—A. Yes, but you must also take into account that the larger proportion of the B.Sc. men are married than the I.Sc. That must affect it somewhat.

Q. You say that the B.Sc. who go to you don't show the same willingness to benefit by practical training as the I.Sc. do?—A. They are very much better in the chemical or physical laboratory, but they are a little bit impatient over work in the carpenter's or blacksmith's shop, regarding it as drudgery. They don't see the benefit of it.

Q. Their higher knowledge of mathematics would be of greater help to them?—A. They are better students as far as passing examinations is concerned.

Q. You put them through a practical course for one year after they have passed their examinations; is that not sufficient to make up the deficiency in regard to practical work?—A. No; what is one year compared to five years. That is demanded in England after a university degree before they can get practical work. Here they expect me to turn out practical engineers after one year's training. In the last 12 years no B.Sc. has won the guaranteed Assistant Engineer's post.

Q. He has not to spend five years in apprenticeship without payment. Has he?—A. They do in England. You have to pay for it the whole time, but he should be able to arrange to get suitable wages.

Q. That is only to qualify him to rise by practical experience?—A. You begin at the foot of the ladder after having done that.

Q. Do you find that these B.Sc.'s are very much addicted to "by-hearting" methods, as you describe them?—A. I think they probably do not find it so necessary to do so now.

Q. You say here, "I do not think that most Bengali lads approve of these methods of instruction, especially those that join us after passing the intermediate in arts or science examinations and are more fixed on their "by-hearting" methods. Does that apply to the case of those that join you after passing the intermediate science?—A. I was more comparing the matriculation stage with the intermediate science. In the apprentice department I admit students in the matriculation stage, and in the engineering in the I.Sc. Those in the matriculation stage take more kindly to workshop instruction than the older students.

Q. In view of this opinion do you think that if drawing were insisted upon earlier in the school course, and students received a good education in elementary physics and chemistry before they passed their matriculation examination, a five years' course after that—if the course for the matriculation was modified—would suffice for the engineering degree?—A. So much depends upon the method of examination and the standard adopted by the examiners.

Q. You don't insist upon a high degree of qualification in the English language for the engineering standard; what you want is a knowledge of mathematics, physics, chemistry, and a good knowledge of drawing?—A. Yes.

Q. So if you had a modified system of the school course, in which these subjects received proper attention, then in your opinion a five years' course in engineering would be sufficient?—A. I would not prescribe it for a man who is going to take a university course, because he ought to have some training in literature as well, but for a man who is going to be a supervisor, specialising would be an advantage.

Q. For a man who is to rise to the top, you want a more liberal education?—A. Yes. After my students leave college and mix with deputy magistrates and other people who have had a more liberal education, they don't shine; their English is a bit faulty; they are under certain social disadvantages, because of their want of knowledge of those general subjects which might enable them to meet these officers as equals.

Q. You think that for those who aspire to higher engineering appointments and examinations for university degrees, this is very desirable?—A. As things are in Bengal, I think it is simply because the ordinary curriculum both in school and college is so peculiar. The student goes to school and takes the minimum number of subjects, whereas in England you take the maximum number. If four subjects are required, you appear in four; in England you appear in eight. The same in the college courses, they take the minimum number and the whole outlook of the student is narrow, because of his narrow education.

Q. Suppose you were to take up only the B.Sc.'s. Do you think, in view of the knowledge of mathematics, physics and chemistry, which they possess, a three years' course would give them all the theoretical knowledge they require of engineering?—A. I am admitting B.Sc.'s now.

Q. In their case, could the course you are putting them through now be covered in three years?—A. No, but if they had a real working knowledge of drawing and of mathematics; if they had mastered their subjects and not only obtained 33 per cent. of marks, and have only read the easy parts of the syllabus and not the difficult parts.

Q. Supposing they had taken honours?—A. That is a different matter; then they could go through the course in three years.

Q. You say, "The university type of man can be trained just as well in India as in Europe." What do you mean?—A. I think if you turn out too many of that class of men who find it difficult to get employment, you would only be adding to discontent in the country. We are now

turning out far too many civil engineers in Sibpur. What is the result? All these students who go into the overseer grade are entirely discontented. Perhaps a school-mate has become an assistant engineer and they look with jealousy at him.

Q. That is because their emoluments are not sufficiently good?—*A.* No, it is a matter of position. There is no demand for them in the country. They are occupying the post of overseer to the exclusion of the overseers for whom I have got another training class.

Q. That would apply to numbers put through the college, not to the qualifications of the men admitted; for instance you have said that the B.Sc. is a better student in all theoretical knowledge than the non-Bachelor; supposing you restricted the number to B.Sc.'s, then he would not be a dangerous type?—*A.* If you restricted the number that can be readily absorbed by industries, it would be a good thing to do.

Q. Then you are probably inclined to modify this sentence of yours?—*A.* I daresay I would. I am only looking at it from the point of view of want of employment, and nothing else.

Hon'ble Sir R. N. Mookerjee.—Q. You complain that you don't get the best type of students in the engineering profession; don't you think that the difference in the grades of the appointments, Imperial and Provincial, has something to do with it?—*A.* Yes, it certainly would have.

Q. In your experience, coming in contact with these engineers who come out from England under Imperial appointments and those sent out by your college, do you find much difference in their education?—*A.* I have not got the same intimate knowledge of men who come out from England. I only judge from my own case. The course of training we put our students through is a thorough course of training.

Q. In reply to the Pandit you said that you considered that the standard and quality of teaching, both practical and theoretical, in Sibpur is, if anything, superior to Roorkee College; can you say that with reference to the colleges at Madras and Poona?—*A.* I made more visits to Roorkee than to Madras and Poona. I think we have a stronger professorial staff and better equipment and facilities for training.

Q. Do you think the system of guarantees has anything to do with not getting a better class?—*A.* It makes the Roorkee College very much more attractive than the Sibpur College, and it is probable that you will find a better class of student at Roorkee. Their fees are very much higher than at Sibpur, and they are probably drawn from a different grade of society.

Q. Do you attach any real value to your connection with the Calcutta University; is it advantageous to your college or disadvantageous?—*A.* I don't see any real advantage in the connection. The connection is only valuable to me from the point of view of what you would call "window dressing."

Q. How much time have you, as Principal, to give to university meetings?—*A.* For the last fourteen years or so I have given up practically every Saturday to university work, and it is a very heavy drain on my energies. It would be much better if I could spend that time in keeping in touch with the future employment of my students.

Q. You replied to the Pandit that practical training is not recognised by the university, and that is one of the reasons why B. Sc.'s don't care for practical training; taking that into consideration, if your college were separated from the university it would be better for all concerned?—*A.* I think so. I may say especially with reference to the last question you asked me, I would judge that about one-quarter of one per cent. of the business I am called into Calcutta to discuss has relation to engineering. My time is absolutely wasted in the university.

President.—Q. Do you get any advice of value from the university?—*A.* No.

Q. You have a governing body; do you get more or better advice from your governing body than you do from the university?—*A.* I get much better advice from the governing body. All practical questions I take to them.

Q. So far as actual efficiency is concerned, it would be better for you to cut your connection with the university?—*A.* Yes, I find it is merely a body of examiners; there is no university life.

Q. What about the hall-mark that is stamped on your students; is that of any market value to you?—*A.* It helps to attract students to the college, and at the present time it has an exaggerated value in the eyes of employers.

Q. So long as an employer can be taken in in this way, it would be an advantage to be connected with the university; is that the conclusion?—*A.* Yes.

Hon'ble Sir R. N. Mookerjee.—Q. You say that commercial firms engage them because they are B.Sc.'s or M.Sc.'s?—*A.* I don't think they do.

Q. Then does Government alone stipulate for certain theoretical qualifications besides practical experience?—*A.* Certain theoretical qualifications are always laid down quite apart from practical experience.

Q. Can you give us an idea of the cost of giving higher engineering education to students per head?—*A.* No, I cannot answer that question, but I have got one or two points, and that is with reference to the question of the cost of education at Sibpur. The college costs

Government about 2 lakhs out-of-pocket every year, excluding all interest on capital investments and all pension charges. The tuition fees in the engineering department are Rs. 120 yearly for the first two years and Rs. 180 yearly for the second two years. Against that 63 per cent. of my students have scholarships or are receiving assistance in some way or another, 80 per cent. of the money is returned to the student in the shape of scholarships. In the apprentice department, where we have mining courses, the tuition fees are only Rs. 36 yearly, and 85 per cent. of my students receive assistance in the way of scholarships or reduction of fees, including 40 Indian students who are received on inclusive fees, *i.e.*, tuition, board and lodging at Rs. 3 per month, 25 Anglo-Indian apprentices who pay Rs. 6, and 25 who are free. From that department we return the students in one form or other four times what we collect in tuition fees. This is for the whole department. I have not got separate figures for mining, etc. In the whole department I return to the students four times what I take from them in tuition fees.

Hon'ble Pandit M. M. Malaviya.—Q. In what shape?—A. Lodging, reduction in fees, etc.

Hon'ble Sir R. N. Mookerjee.—Q. In your system of education, you don't have any lectures as to how to keep accounts?—A. No, we have no lectures on accounts of any description.

Q. Would it be a very difficult problem?—A. No, it could be very easily arranged. I think it would be a very good thing to introduce if our boys are going afterwards to help in starting industries, they ought to know something about it.

Dr. E. Hopkinson.—Q. Has the Board of Faculties of the University any control?—A. They are supposed to inspect the college once a year, and if they consider that the facilities for teaching are not up to the mark, they can disaffiliate the college.

Q. Then the controlling body is what you would describe as a governing body?—A. There is a governing body of 9 to whom the Government give a grant of nearly fifty thousand rupees a year for contingent expenses like the purchase of apparatus for the practical training of students, laboratory, etc. All questions of the employment of the staff, construction of new buildings, etc., go to the governing body. It is appointed every year by Government for that particular purpose.

Q. In all matters of curriculum you have a free hand?—A. No, with reference to the university courses they have to be approved by the university, and then the university sends them up to the Government of India who eventually sanctions them. With reference to the other courses, since we have two other institutions, one at Bankipur and one at Dacca, the Joint Technical Board advise us with reference to the syllabus.

Q. Take the experiment you refer to, *viz.*, the dyeing school; to whom did the proposals you put forward go?—A. Those were sent to the Director of Public Instruction. There was no governing body at that time.

Q. It would not go before the university?—A. No, it is not a university question.

Q. You attribute the failure of those classes to the fact that there was no cotton in Bengal to be dyed or bleached. Do you think that was the sole reason for the class, not being a success?—A. We have not turned out many students; perhaps eight or ten students only since the class was started, and the majority of those have not followed the subject of dyeing. One is employed at Kalimati.

Q. What constituted the failure? Did you fail to get students?—A. Yes, the fact being that there was no employment for students after they were trained. There was a great demand for the artisan classes. When I found that the other classes were failing I asked Government if they would allow me to divert some of the scholarships to the training of artisans and the artisan classes have always been full. In the dyeing department we gave free education and a scholarship of Rs. 14 per month, which would practically support the boy in college, except for the purchase of his books. Even that would not attract the students. We also gave a diploma in the principles and practice of dyeing and bleaching.

Q. How is it that it was suggested that if the university offered the B. Sc. degree, the class would have been a success?—A. More students would have been attracted, simply on account of the B. Sc. degree, and because they would be supported for 2 or 3 years without expense to their guardians.

Q. That would not alter the scholarships that they might be able to obtain?—A. Every student joining the dyeing classes was given a scholarship.

Q. Whether reading for a degree or not?—A. Yes. He would also imagine that the B.Sc. in dyeing would give him a great claim on Government for employment afterwards either in teaching or otherwise. He would say that he had been deluded into joining the class by me when there was no possibility of getting employment afterwards.

Q. The only appointment he would be likely to obtain would be in connection with bleaching or dyeing; how does the question of the B.Sc. degree make any difference in that respect?—A. It would not to the practical man, but to the student who would be attracted to the college. He would be very much attracted by the possibility of getting the B.Sc., especially as he would be getting the B.Sc. cheaply.

Q. Would the B.Sc. in dyeing imagine that some position in dyeing would be created for him?—A. He would probably conceal the fact afterwards that he was a B.Sc. in dyeing, and say that he was a B.Sc. only.

Q. What then? Assuming that he successfully concealed the fact, that he knew something about dyeing, what would be his fate then?—A. There would be no employment open for him.

Q. He thinks he would be better off: why does he think so?—A. There is a general hunt for degrees in Bengal. They are very popular. I had an application from a teacher in the Central Provinces, who said he wanted to join the dyeing classes. When I cross-questioned him for reasons, he said it would improve his value as a teacher. He was already in employment but wanted to get a degree in dyeing.

Q. Are those who hold the B.Sc. degree engaged mostly in teaching; is that how they find employment?—A. I am afraid I don't know, not having sufficient knowledge of the university side.

Q. Do you differentiate between those who obtain the B.Sc. degree and those who do not, but hold a certificate?—A. The B.Sc. would be of greater value from the teaching point of view.

Q. You mean in obtaining a teaching appointment?—A. I think so. But at the present moment certificates are of value because there are not many in the market. The students place value upon these certificates. I know of an instance where boys who have passed the sub-overseer's examination have joined a course for the training of Sanitary Inspectors without any intention whatever of following the profession afterwards, but they considered that it added to their prestige to have a number of qualifications.

Q. You said that the total cost of running the college was 2 lakhs?—A. 2 lakhs annually, excluding interest on capital and pension charges.

Q. You said that the amount returned to students was four times the amount of their fees?—A. Tuition fees; they also pay other fees for boarding, etc.

Q. The total figure with regard to tuition fees; how much does this come to?—A. The tuition fee in one department is ₹120 yearly for the first two years; and ₹180 for the second two years.

Hon'ble Pandit M. M. Malaviya.—Q. Do you charge for 10 months or 12 months?—A. We used to charge for 12 months but now they pay 8 instalments instead of 12. In the engineering department in the year 1914-15 the total received from students in the shape of fees is Rs. 14,521. The scholarships and stipends paid to students were Rs. 9,639, i.e., the fees exceeded the scholarships by Rs. 4,883, for an average of 92 students, the average attendance during the year. In the other departments the fees collected amounted to Rs. 3,365 and the scholarships and stipends to Rs. 15,679. The scholarships exceeded the fees by Rs. 12,314. In the apprentice department the average number of students was 166. The number varies from month to months.

Mr. A. Chatterton.—Q. Do you know the kind of training that is given to boys going to the Osborne Naval College at home?—A. I know that class of teaching.

Q. I gather from the examination going on this afternoon that you are not at all satisfied with the previous training that the students have received before they come into the engineering college, and you admit boys at present who have passed the intermediate examination or a higher examination. They go through certain course of instruction in the engineering college, and finally take a degree at the university. I also gather that you are not at all averse to disassociating the college from the university?—A. Quite so.

Q. Would it be practical to take boys into the engineering college for the engineering classes at a very much earlier age than is done at the present time, and to give them an education in the engineering college which would embrace not only the ordinary engineering subjects now taught, but also include some amount of suitable English and mathematics and anything else necessary to give them a fairly liberal education to hold their own with other Government officers afterwards: would it not be practicable to take in boys of the age of 16, and cut them off altogether from the university system of the country?—A. I don't think so; the university system has far too great a hold in Bengal.

Q. That is the very reason, if we had an Imperial college established on these lines, we should probably be able to draw students into the engineering college from a different strata of society altogether?—A. Against that we must remember that there is only one engineering college in Bengal, and it would be rather rough on the province if you force everybody to come in at an earlier stage. A great many parents have not made up their minds about the profession they want their boys to follow, and it is right that he should continue his general studies until he is about 18, when his parents would know better what his bent is, we could do better with him, if he joined at that age. My point is that at the present time the Bengali guardian keeps his boy in what he calls "the general line" as long as he possibly can. He cannot see at the age of 14 what the trend of his mind is; he does not know whether his inclinations will lie towards doctoring, engineering or anything else, and I don't think, from the educational point of view, that he would be able to specialise at such an early age. I don't think it would be a sound proposal.

Q. Of these students who go into your engineering college, what percentage become officers in the Public Works Department or the various branches of the engineering service in the country, or are masters in private work?—A. I have not got any exact figures by me, but speaking generally the number is between 35 to 40 per cent.

Q. That is to say, you are training practically three students to get one officer, and the other two-thirds go into the subordinate ranks of various services, and naturally they are

discontented all their lives?—A. Yes, it produces discontent in other classes as well as in their own.

Q. Are the prospects the same in all those engineering colleges?—A. Not in Roorkee. Every man who passes out of the engineering classes gets an officer's appointment. Although they have six or seven guaranteed posts in their assistant engineer's grade. When you come to the upper subordinate class, they have 15 upper subordinate posts guaranteed, to my one.

Q. The training which you give to the engineering class is not exactly suited to produce what you call a first class upper subordinate?—A. No.

Q. So that to get this comparatively small number of officers you are giving a bad training to men who would otherwise make good upper subordinates?—A. That is so.

Q. Then if a central engineering college were established it would not be necessary to make the classes so large as they are at present?—A. No, it would not. There is one point which I think we are just coming to, and that is that owing to our present organisation of these engineering colleges—I am speaking more especially of Sibpur where we have the upper and lower subordinates all being trained together, and all joining the same mess—it makes the gentlemen who are capitalists, and to whom we may look to promote the industrial development of the country, very chary of sending their sons to the college at Sibpur. I cannot give them accommodation of the sort that they have been accustomed to have at home, and from that point of view I think you may say we are not properly organised.

Q. Don't you think that we should get a better class of engineer in this country, if we recruited them from a higher strata?—A. I think our drawing from a better social strata is more likely to produce a better officer, people who are accustomed to the handling of money.

Q. People of that class don't pay so much attention to a university education as is the case when students are drawn from the poorer classes. Would it not be advisable to take the boys at an earlier age and give them a thorough education, such as I have mentioned is given in Osborne rather than continue on the present system. It would mean a bigger staff but the results may be well worth it. You would teach them all the science they have got to learn in this college; they would begin with mathematics, English and drawing, and the course of instruction would be much longer if you brought them in at 16 and turned them out at 20. The final result would be a more highly trained and more valuable officer, although perhaps we could not afford one such college for each province in India. I suppose that the whole of India could afford to establish an institution on those lines?—A. I am still rather of opinion that you would miss a very large number of excellent people, because their guardians do not realise the necessity of their leaving school at that early age.

Q. What we want people to look at is that education is not necessarily connected with the university. There are other systems by which students can be trained than the system in vogue at the present moment. It is not a question of everybody being able to take it up, but whether there would be a sufficient number who would be willing to do so. We might make a beginning with engineering, and if we found that successful we might develop in other directions. There are peculiar facilities in the training of engineers, because Government would be the largest employer?—A. Certainly, I think you would turn out very much better men in that way. I would however like to consider my reply to that.

Q. You are not prepared to commit yourself to the statement that it would be a better system than the present one?—A. I am not prepared to do that; I think the country would suffer if you had it that way.

Q. In what way?—A. The large number of students who would like to take up engineering and continue their studies in the B.Sc. or I.Sc. class would be excluded. You might say that they are able to go home and get a training elsewhere.

Q. This would not apply to the training of the upper subordinate in the least. The great bulk of your students you say not more than one-third rise to the officers' grade, therefore the great bulk would still be unaffected, whereas we should be able to ascertain clearly were there a better system of education, to what degree of engineering fitness the people are capable of rising?—A. I think if you were to introduce a college of that sort, you would probably find other people trying to start colleges directly affiliated to the university, teaching the present courses. You might make a *corps d'élite* that way. If you have the others started you would soon find that the *corps d'élite* would disappear. Political influence would be brought to bear and the others would try to come in. Cooper's Hill was abolished to give the universities a chance, so this would be abolished in order to give the university in India a chance.

Q. If a college on these lines were established, would it be practicable for private enterprises to start rival engineering colleges; where would they get their staff from?—A. We know very well that they started private medical colleges in Calcutta, in order to meet the demand. They were not fortunately successful from the medical point of view, but they had numbers and numbers of students.

Q. There is a difference between the engineering and the medical profession; there is an enormous demand for qualified or half-qualified medical men; but there is no demand for

half-trained engineering men?—*A.* When the university lays down a syllabus of instruction, as the Calcutta University has in the B.E. degree, it would be possible for institutions to train students for that degree at a very much less cost than Sibpur by eliminating the workshops which the university ignore.

Q. The University would disaffiliate them, because they were not properly equipped, that is to say if the university performed its functions properly?—*A.* If the university had capable engineers on their syndicate, they probably would.

Q. I understand it is the duty of the university to inspect your college every year; do they do so?—*A.* Practically.

Q. Do they formally do so?—*A.* I have had about three inspections in six years.

Q. Have they raised any questions of inadequate equipment?—*A.* No, but when you appoint inspectors they have always got to complain about something or other, whether right or wrong.

Q. In such a college as I am suggesting, would they not attach more value to the diploma than to a university degree?—*A.* They would, because it would ensure them employment afterwards.

Q. In the scheme which you put forward here, you propose the federation of the existing colleges; if that federation is to be of any value it would mean disassociation of the existing colleges from the existing university, and would imply the granting of a diploma by the Board or the Government of India who would be over this federation?—*A.* Yes.

Q. At what stage, under the present system, do you think you should take your students away from the ordinary channels of education and divert them into special courses for the training up of engineers; what would be the best stage in the present system of education for this?—*A.* I think the intermediate science stage. If they continue their education to the B.Sc. stage it would mean that the majority of the students on joining the college would be 21 to 22 years of age. Then the five years course after that would make it 26 or 27 years, presuming that they don't fail to take promotion every year.

Q. I suppose your average boy matriculates at 16 or 17?—*A.* He cannot before 16.

Q. Well he matriculates between 16 and 18; don't you think it would be practicable either in this federated system of engineering colleges, or a central engineering college, to give better education to the boy who was going to be trained as an engineer during the two years that he is going to spend either in this college or in an ordinary arts college. Would it not be practicable to devise a system of education that would enable him to spend his time better and with much more certainty, since he knows at the earlier stage what was going to be his proper career?—*A.* It would be quite possible, I think.

Q. There may be many reasons against this on the score of expense or otherwise, but don't you think that on the score of feasibility it would be practicable to get as students a very much more promising class of boys?—*A.* You would probably have to face this difficulty that in order to get the certainty of admitting, say, 40 boys at the present age, I would probably have to admit 100 boys to that special course of training. You could not bind them all to come to engineering. They would probably want to leave for several reasons. Take the engineering department, I lose about one-quarter of my students during the first year.

Q. That was not my experience in Madras. I don't think we ever lost a student unless he died?—*A.* In the apprentice department we lose up to 40 per cent.

Q. I don't think it is the experience in other classes where you have this highly specialised course of training that the number that fall out on the way is at all large?—*A.* In the old days when I admitted 40 to the engineering department, my average output was 13 B. E.'s.

Mr. C. E. Low.—*Q.* It is certainly the case in the agricultural college that you lose anything up to 50 per cent. during the three years?—*A.* In the old days many of the students would go away in the first week, because they did not like the work in the workshop.

Mr. A. Chatterton.—That sort of thing would not apply to a high grade of college where the boys are taken at a comparatively early age, and where the social requirements would be of a very much higher class. They would all live in hostels under very careful and close supervision.

Hon'ble M. M. Malaviya.—*Q.* Are not courses in engineering now ordinarily part of the curriculum at every English University? I mean there is not a Faculty for Engineering in almost every English University?—*A.* I believe so.

Q. In America there would hardly be a university that would not offer a degree in engineering?—*A.* No.

Q. So also in Japan. Apart then from the reasons you have given for disassociating the engineering college from the university, a degree in engineering should form part of a university course?—*A.* In the educational world, perhaps, yes, but you will find that the technical college education is becoming more popular than the university.

Q. Take, for instance, the Imperial College of Science and Technology. It stood a separate institution for many years, but it has now become a constituent of the London University?—*A.* I don't know.

Q. So that the tendency is to include engineering colleges which stood outside a university in a university. Do you think on the whole that the atmosphere which the students would

find in a university would attract a better type of students, to an engineering college which was affiliated to it than would otherwise be attracted?—A. In my college at Sibpur there is no university atmosphere at all.

Q. If you cut off the lower portion of the institution and raised it to the university standard, do you think then the atmosphere would be better and attract a better class of students?—A. The only value of a university connection is the atmosphere of the other graduate courses, which we don't get.

Q. And that corporate life of students exercises a stimulus and also a moral influence?—A. Yes.

Q. Are you aware that two engineers from the Roorkee College are occupying very high positions in Bengal?—A. Yes.

Q. You have seen many Roorkee men, do you think they are altogether of a higher level than the students whom you turn out under existing conditions?—A. The way I would put it would be this, that they mix more easily in society.

Q. Do you ascribe it to the fact that the students at Roorkee know that they have to work with officers as men of equal standing, or do you ascribe the difference you find in Sibpur to the fact that the students have the idea that only one can obtain an appointment and the rest of them have to work on a very much humbler plane?—A. Yes, and you might add that at Roorkee the university students live entirely separate lives to other students. They have their own mess, where they are expected to live in good style, are expected to dress for dinner, and are prepared for an officer's post, whereas at Sibpur my university students have a joint mess with the sub-oversers and overseers.

Q. Then what is needed to raise the Sibpur Engineering College to a first class engineering college are three things; one the cutting off of the lower class, the sub-overseer's class, the second the giving of an assurance to the students that they will find employment as engineers in the public service, rising up to the executive engineer's grade; and the third the provision of a numerically stronger teaching staff?—A. You cannot give that assurance. At the present time the Bengal Government only take one student from me every other year. Before they cut off Bihar and Orissa, we had double the number I have now. The Bengal Government took one every year; now they take one every alternate year.

Q. If the students had a little better prospect held out to them then many of your difficulties would disappear, so far as attracting a better class of student is concerned?—A. Yes.

Q. You would attract students who would be fit to become first class engineers, to take up executive engineers as the experience of Roorkee shows?—A. Yes, but we would have to alter the living arrangements entirely.

Q. You have said that the fees here are Rs. 120 for the first two years and Rs. 180 for the next two years; what fee has the student to pay in a University in England when he goes in for the engineering department?—A. I don't know what the fee is.

Q. In your college a student has to pay Rs. 600 for the full course, boarding being separate?—A. Yes.

Q. Has he to pay a fee when he goes in for the apprenticeship period of one year?—A. No, he is paid a scholarship then of Rs. 50 a month.

Q. So far as you are aware, do you think that a student has to pay more than Rs. 600 for a degree in engineering in Manchester?—A. I am not quite certain.

President.—The fees in Manchester probably works out to 40 guineas a year, i.e., Rs. 640 yearly. Those are nett fees. There are certain other charges they have to pay of various kinds. It is about Rs. 1,800 for a three-year course.

Hon'ble Pandit M. M. Malaviya.—Q. In view of the average incomes of the people in India and in England, don't you think that Rs. 600 against Rs. 1,800 is not a low fee to pay?—A. If they all paid it, it would be a fair fee but when you return 80 per cent. of the fees, it is very low indeed.

Q. You have stipends and scholarships in England? Have you not?—A. Not to that extent.

Witness subsequently forwarded the following statement :—

Statement showing the careers of former mining students of the Sibpur Engineering College.

Name.	Diploma in mining.	Colliery Manager's certificate.	Position attained.	REMARKS.
1. A. A. Jones .	Passed 1907 .	1st class 1910	General Manager, West Tethuria Colliery.	Fighting in France.
2. E. Kelly .	Passed 1907	...	Surveyor, Nundydrog Mine.	
3. T. Powell .	Passed 1907 .	2nd class 1908 .	Manager, Rajara Colliery.	

Statement showing the careers of former mining students of the Sibpur Engineering College—*contd.*

Name.	Diploma in mining.	Colliery Manager's certificate.	Position attained.	REMARKS.
4. Abaidullah . .	Passed 1907 .	...	Prospector, Diamond Prospecting Company, Punjab.	
5. E. Murphy . .	Passed 1908 .	...	Assistant Manager, Charanpur Colliery.	
6. P. C. Pundit . .	Passed 1908 .	...	Assistant Manager, Jamgram Colliery.	
7. E. Milchem . .	Passed 1908 .	...	V. G. Manager, Jamgram Colliery.	
8. U. N. Mukerji . .	Passed 1909 .	...	Sub-Divisional Officer (P. W. D.), Suri, Birbhum.	
9. A. E. McGrath . .	Failed . .	2nd class 1913 .	Assistant Manager, Lodhna Colliery.	
10. G. Bridgwater . .	Passed 1908 .	2nd class 1909 .	Manager, Aiyapatra Colliery.	
11. J. H. W. Payne . .	Passed 1910 .	1st class 1916 .	Assistant Manager, Deshargarh Colliery.	Gone to the front.
12. S. N. Bhattacharjee	Passed 1908 .	1st class 1912 .	Manager, Khora Ranji's Colliery.	
13. F. Short . .	Failed . .	...	Assistant Manager . . .	In Mesopotamia.
14. J. N. Sen . .	Failed . .	...	.....	
15. W. Powell . .	Failed . .	...	Assistant Manager, Bhurra Dhemu Colliery.	
16. K. C. Bannerjee . .	Failed . .	...	Assistant Engineer, Calcutta Improvement Trust.	
17. N. C. Dutt . .	Passed 1910 .	...	State Geologist, Jeysalmer.	
18. G. A. Hyde . .	Passed 1910 .	2nd class 1913 .	Manager, Sitanalla Colliery.	
19. S. M. Chatterjee . .	Passed 1910 .	1st class 1914 .	Manager, North Baraker Colliery.	
20. H. Brown . .	Passed 1910 .	...	.....	In Rawalpindi.
21. J. N. Bhattacharji	Passed 1910 .	2nd class 1913 .	Manager, Albion Coal Company.	
22. N. G. Roy . .	Passed 1911 .	...	Contractor, Pabna.	
23. C. C. Chatterji . .	Passed 1911 .	...	Overseer, Port Commissioner, Calcutta.	
24. D. K. Penfold . .	Passed 1911 .	1st class 1916 .	Assistant Manager, South Bulliari Colliery.	
25. O. N. Devereux . .	Special Course .	1st class 1910 .	Messrs. Burn & Co., Howrah.	
26. A. T. McGuire . .	Failed . .	...	.....	Gone to England for training.
27. E. Seymon . .	Failed . .	...	.....	In Burma.
28. N. C. Khan . .	Failed . .	...	.....	
29. M. D'Cruz . .	Failed . .	...	.....	
30. K. Mirza . .	Passed 1911 .	...	Officiating Director of Mines, H. H. the Nizam's Government.	
31. B. K. Ganguli . .	Passed 1911 .	...	Surveyor, Giridih Colliery.	
32. B. M. Bagchi . .	Passed 1912 .	2nd class 1913 .	Chief Surveyor, Kenwadih Colliery.	
33. J. C. Sen Gupta . .	Passed 1912 .	2nd class 1913 .	Manager, Kusumkanali Colliery.	
34. D. O'Reilly . .	Failed . .	2nd class 1915 .	Assistant Manager, Sendra Colliery.	

Statement showing the careers of former mining students of the Sibpur Engineering College
—concl'd.

Name.	Diploma in mining.	Colliery Manager's certificate.	Position attained.	REMARKS.
35. S. C. Sanyal	Failed	2nd class 1909	Manager, R. Ajaiewala's Colliery.	
36. R. S. Ghosh	Failed	2nd class 1909	Manager, Swardi Colliery.	
37. B. C. Stone	Failed	...	Customs, Calcutta.	
38. R. Hunter	Passed 1912	1st class 1916	Assistant Manager, Belatand Colliery.	
39. H. M. Cox	Failed	1st class 1911	Manager, Sodepur Colliery.	
40. M.N. Bhattacharji	Failed	2nd class 1911	Manager, Kalipahari Colliery.	
41. M. L. Guha	Failed	...	Manager, Nurungo Tin Mine.	
42. P. B. Banerjee	Failed	2nd class 1913	Manager, Jotejanaki Colliery.	
43. K. K. Mukerji	Passed 1913	...	Manager, Jaghubatta Mine.	
44. P. Venderbeck	Passed 1913	1st class 1914	Manager, Choitadih Colliery.	
45. H. L. Fox	Failed	...	Customs, Calcutta.	
46. M. D'Souza	Failed	...	.....	
47. J. K. Bhattacharji	Failed	...	Surveyor, New Telturia Colliery.	
48. A. R. Hatton	Failed	...	Assistant Manager, Chichuria Colliery.	
49. S. C. Sen	Failed	2nd class 1914	Manager, Damagurria Colliery.	
50. F. DeSouza	Failed	...	Assistant Manager, Sitalpur Colliery.	
51. W. Cowan	Passed 1914	2nd class 1916	Assistant Manager, Belatand Colliery.	
52. O. L. Frizoni	Passed 1912	...	Apprenticed to the Sheepbridge Coal and Iron Coompany, England.	Gone to the Front, Wounded and missing in November 1916.
53. H. K. Nag	Passed 1914	1st class 1916	Manager, Lodhna Colliery.	
54. K. C. Dey	Failed	...	Surveyor, Sinidih Colliery.	
55. N. R. Gupta	Failed	...	.....	
56. C. H. Dias	Failed	...	Mine Manager, Wagon Camp, Tavoy.	
57. B. E. Ankim	Passed 1915	...	Assistant Manager, Exa Colliery.	
58. B. K. Mukerji	Passed 1915	...	Head Surveyor, Kusunda Nyadee Colliery.	
59. S. N. Bose	Passed 1915	...	Surveyor, Messrs. Turnbull's Colliery.	
60. J. N. Bhadra	Failed	...	Surveyor, New Khas Jheria Colliery.	
61. F. G. Sheehan	Passed 1916	...	Mining Assistant, Sodepur Colliery.	
62. W. Connolly	Passed 1916	...	V. G. Manager, Sodepur Colliery.	
63. V. deMenzes	Passed 1916	...	Assistant, Manager, Muralidih Colliery.	
64. S. C. Roy Choudhury	Passed 1916	...	Mine Manager, Tavoy.	
65. A. K. Bose	Failed	...	Surveyor, New Khas Jheria Colliery.	
66. C. L. Guha	Failed	...	Assistant, Surveyor, Burma Mines, Ltd.	

WITNESS No. 117.

MR. A. POINTON, *representing—*

- (1) *Kilburn & Co., Managing Agents, India General Navigation and Railway Co., Ltd.,*
- (2) *Macneil & Co., Agents, River Steam Navigation Co., Ltd.,*
- (3) *Andrew Yule & Co., Managing Agents, Bengal-Assam Steamship Co., Ltd.*

WRITTEN EVIDENCE.

Qs. Nos. 97 & 100.—We regret we are unable to give you a precise answer to the first portion of question 97. The province possesses a network of magnificent waterways on which transport facilities have been gradually extended thus greatly assisting industrial development. Transport facilities could be more fully developed on waterways already being used and could be extended to other waterways if the waterways had proper attention.

In countries where transport as a whole has been highly developed it has been recognized "that it is communication which makes traffic and not traffic which makes communication." It therefore behoves the country to look far ahead with regard to her transport facilities in order properly to encourage the development of her industries. By putting the waterways of the country under proper control it would help very materially and economically to increase their value as a transport asset.

In this connection we wish to have the support of your Commission as soon as conveniently possible to the proposal now before Government:—

1. That the waterways of the three Provinces of Bengal, Assam, and Bihar and Orissa should be placed under a permanent staff of Waterway Engineers in the control of a Waterways Trust constituted somewhat on the lines of the Calcutta Port Trust.

In order to give the proposed Trust a solid financial basis it is desirable that sanction should be first obtained from the Secretary of State for carrying out the Grand Trunk Canal and Inland Harbour Projects, which we refer to below. To assist your Commission in considering the proposal we enclose a statement (Statement No. 1) on the subject.

As regards the latter portion of question 97 and question 100 we also wish to have the support of your Commission as soon as possible to the following proposal now before the Government:—

The Grand Trunk Canal

and

Inland Harbour Schemes.

A report with estimates and plans has been made by Mr. Addams-Williams, C.I.E., the Superintending Engineer, South-Western Circle, Bengal, Public Works Department. We are in general agreement with the scheme as set out in the report. This states clearly and convincingly the extent to which the canal and harbour schemes are likely to forward the industrial development of Calcutta and Bengal. Briefly they would provide—

- (a) better terminal facilities;
- (b) many miles of slack water frontage for industrial development; and
- (c) better sanitation.

The report also shows that the projects will fulfil the conditions laid down in the Public Works Department Code and can therefore be classed as productive work and be financed from loan funds.

Mr. A. Pointon will represent us before the Commission. As Mr. Addams-Williams' report is a long one, for the convenience of your Commission a statement (Statement No. 2) has been prepared, more or less in Mr. Addams-Williams' own words, setting forth what appears to be the more important advantages of the Grand Trunk Canal and Inland Harbour Schemes. This statement (Statement No. 2) is being submitted by our representative.

STATEMENT No. 1.

Proposed formation of a Waterways Trust.

For many years the various Chambers of Commerce, the Inland Steamer Companies, etc., have been pressing for a better system of control for the Ganges, Brahmaputra, and Megna group of waterways.

Sir John Woodburn thoroughly appreciated the potentialities of the Bengal waterways and at a meeting of officials and others on the "Rhotas" on the 23rd August, 1902, His Honour decided in connection with the proposed improvement of the Bhagirathi and the canalisation of Tolly's Nullah and Madaripur bhal that the schemes should be taken as one under some such title as that of the "General Improvement of Bengal Waterways." Sir John Woodburn did not live to see the preliminary estimates of the Tolly's Nullah scheme, as he died in October of the same year.

In 1907 the steamer companies wrote to the Governments of Eastern Bengal and Assam and Bengal asking "if a comprehensive scheme could not be adopted for the improvement of the great waterways of the provinces."

Nothing definite having been arranged, on the 7th June, 1912, the Chamber of Commerce wrote to the Government of Bengal pressing for the formation of a waterways trust.

Witness here gave an extract from the confidential proceedings of the meeting of the Standing Waterways Committee, held on 16th December 1914, to consider the question of the proposed formation of a waterways trust.

Through transfer, employment on special duty, leaves, sickness, and retirements there were the following changes (temporary and permanent) of the officials in charge of irrigation (including waterways) during the 25 years ending 1912, viz.:—

In the Office of Chief Engineer of Irrigation, 25 changes.

In the Office of Superintending Engineer of S. W. Circle, 29 changes.

In the Office of Executive Engineer of Calcutta and Eastern Canals, 22 changes.

Both the Chief Engineer and Superintending Engineer have many other duties.

In Canada, U. S. A., and on the Continent of Europe they have permanent staffs of waterways engineers.

The Standing (Advisory) Waterways Committee is formed as under:—

President.

Member of Executive Council in charge of P. W. D., portfolio.

Members.

Four official—

Chief Engineer for irrigation (Waterways).

Superintending Engineer, South-Western Circle.

An officer with financial experience (Secretary of the Financial Department).

A Railway representative.

Five non-official—

Vice-Chairman, Port Commissioners.

A commercial member, Bengal.

A commercial member, Eastern Bengal.

A representative of the steamer companies.

A representative from the National Chamber of Commerce.

If the engineer of the proposed Trust was substituted for the Superintending Engineer, South-Western Circle, the above body of representatives might form the General Committee of the Waterways Trust and probably be sufficient security that the funds provided or guaranteed by Government were being employed to the best advantage. Out of this general committee a small Executive Committee could be created.

STATEMENT No. 2.

ADVANTAGES OF THE GRAND TRUNK CANAL ROUTE AND INLAND HARBOUR.

Mileage saving by proposed trunk route and existing Madaripore bhal canal.

From Howrah bridge via Sunderbans and Barisal to	Distance.	From inland harbour (Manicktola) via Trunk route and Madaripore bhal to	Distance.	SAVING.			Distances reduced by about
				By Trunk canal.	By Madaripore bhal route.	Total saving.	
	Miles.		Miles.	Miles.	Miles.	Miles.	
Chunkuri-Pussur junction.	242	Chunkuri-Pussur junction.	12*	12*	...	121*	One half.
Madaripore . . .	445	Madaripore . . .	209	121	115	236	Do.
Chandpore . . .	451	Chandpore . . .	267	121	63	184	Two-fifths.
Narsaungunge . . .	485	Narsaungunge . . .	277	121	87	208	Do.
Goalundo . . .	585	Goalundo . . .	271	121	143	264	One half.
Barisal . . .	888	Barisal via shortest branch route.	205	183	...	183	Do.

* If the Assassuni khal in the Grand Trunk route is improved, there will be a further saving of 15 miles.

Ton-mileage saving by Trunk route.

On 1913-14 traffic figures 181,000,000 to 204,000,000† ton miles.

On the 15th year estimated traffic figures 277,000,000 to 310,000,000† ton miles.

† Based on mileage saved if Assassuni khal is used.

In addition to the ton mileage saved the Grand Trunk route will give the following advantages :—

- Greater safety due to absence of snags and avoidance of large open estuaries.
- Less liability to delays from silted channels (trouble increasing) and bad weather.
- The route would pass through cultivated country instead of through the jungle tracts of the Sunderbuns.
- Greater carrying capacity secured for vessels as the Trunk route being a safe one, vessels could be loaded to a greater draft—an extra foot being equal to, say, 25 per cent. additional carrying capacity.
- Avoidance of the great delays at the Howrah bridge and the difficulties of night running on the lower reaches of the Hooghly.
- Greater regularity in arrivals and departures of vessels.

The proposed inland harbour and canal would provide the great advantages—

- (1) of more up-to-date terminal facilities for handling cargo,
- (2) of many miles of slack water frontages for the development of industries, and
- (3) of better sanitation.

1.—Facilities for handling cargo.

"We possess a network of magnificent waterways unequalled in the world, which contain a few weak links that can be kept open by suitable dredging plant, and which require one short link to Calcutta which this project will supply" (*vide* Mr. Addams-Williams' report, page 35, line 2). "I believe I am correct in saying that there are over 20,000 miles of waterways in the provinces of Bihar and Orissa, Bengal, and Assam" (*vide* report, page 55, paragraph 97, line 16). These well matured views further demonstrate the urgent necessity of adopting for handling cargo in Calcutta modern methods which can only be fully obtained by the use of inland harbours and canals in the vicinity of a large terminus. In this connection the following may be of interest. In his very able book "Garden Cities and Canals," issued about two years ago, Mr. J. S. Nettlefold (author of "Practical Town Planning") says on page 19: "In uncivilized countries towns are built on the banks of rivers; in civilized countries the river or canal is brought to the town, etc."

(a) "As now laid out (*vide* report, page 39, paragraph 73, line 8) the water frontage of the proposed inland harbour and branch canal amounts to a little under 14 miles with a maximum over all length of $2\frac{3}{4}$ miles from the offtake of the branch canal to the south-western corner of Harbour No. 2, and there is room for a large additional water frontage close by to the south of the branch canal." In designing the harbours "the object aimed at is to supply adequate frontage in communication by road and rail, so that, as far as possible, vessels will not have to move long distances in the harbour for various purposes" and "the main marshalling yard will be located on the north bank of the Kistopore canal, where it will not interfere with expansion (either of the harbours or of the city) but will, at the same time, be fairly central."

(b) *Inland exports*.—The harbours as planned would give up-to-date methods for dealing with traffic. Transit sheds for *inland exports* (general) would be provided, having ample frontage accommodation with little variation in water levels where vessels could moor within a few feet of the sheds. It will also be easy to adopt a system of road communication, etc., by which street traffic congestion could be much minimised and perhaps avoided altogether. Freight coal can be dealt with on the north side of the Kristopore canal near the marshalling yard, while provision can be made for bunker coal on the north side of Harbour No. 1 near the eastern end. There would be ample room for salt golahs.

(c) *Inland imports*.—"In the north-west corner of the (salt) lake is a suitable site for the institution of a *jute bazar*. As designed, the area available amounts to 795 bighas and has a water frontage of two and a half miles" (*vide* report, page 38, paragraph 70, line 14). There would be also good direct rail and road communication with the above site. Vessels with jute consigned direct to mills and presses would have ample accommodation for transshipping their consignments into barges within the canal and harbour system. "If the *tea industry* requires accommodation at the harbour, a good site (frontage 3,000 feet or more) is available on the west bank of the western jute dock; another possible site (frontage 3,500 feet or more) is on the south bank of Harbour No. 2 to the east of the Surah Jute Mills" and parallel with Narkaldanga road (*vide* report, page 39, paragraph 71, line 6). There would be in either case good rail communication with the tea districts and docks and probably later on direct canal communication with the latter.

(d) "The shape of the harbour will enable vessels to turn easily at the western end, while at the same time providing somewhat extra water frontages and a large area on the island between the two Harbours (Nos. 1 and 2) for the housing of coolies, etc., and for offices, all of which will be close to the points at which the exports and imports are handled" (*vide* report, page 38, paragraph 68, line 8).

(e) "*Passenger traffic* will be dealt with at the transit sheds, where a tram connection can be supplied from Upper Circular road *via* the Manicktolla road" (*vide* report, page 38). •

(f) "The western end of the harbours can be utilized for *merchants' godowns*. This site appears to be most suitable since the lead to town is the shortest. Foreign imports from the docks can be dealt with to the west of this site, which will be connected by rail with the Eastern Bengal main line to the south of the Ultadinghi road. Merchants requiring delivery of their goods at the harbours for export can therefore arrange to have them booked through from the docks; if delivery has to be taken at the Port Commissioners' Foreign Import Depôt at Balliaghatta, the goods will either have to be carted from Balliaghatta to the harbours or into the town first and then back at the harbours; town deliveries can be made at Balliaghatta Depôt" (*vide* report, page 38, paragraph 69).

(g) *Rice trade*.—A large triangular area (with two to three miles frontage round it) between the south-east of Harbour No. 2 and Dhappa could be devoted to the rice trade. There would be complete rail connection with up-country stations and docks. The latter connection could be shortened by making a branch line through Dhappa to the main line south of Balliaghatta. As regards a safer and quicker water connection between the docks and inland harbour, that would be obtained when the following proposal is carried out.

(h) "Another improvement, which could be made at some future date, is the opening up of an inland water connection with the Kidderpore Docks by means of a canal (from the canal and inland harbour system) across the southern lake and thence *via* Tolly's Nullah and the Port Commissioners' boat canal, which could be used for direct shipment if a demand for such convenience arises. This connection would save delays at the dock entrance" (*vide* report, page 40) on the river as well as provide a safer and quicker route between the inland harbour and ocean docks.

2.—Slack Water Frontages for the Development of Industries.

(a) "When the trunk canal and harbour are made, Calcutta will be provided with a magnificent additional waterway running due east at right angles to the Hooghly along which expansion can be carried on, every part of the harbour area being capable of being connected by road, rail, and water communication (*vide* report, page 36, paragraph 65, line 16).

(b) As previously stated, the branch canal and harbour area will afford 14 miles of frontage. Some sections of this frontage will be available for industries. Along the main canal, which will have a total length of 24 miles, there will be many suitable sites for industries. The whole of its northern bank can be easily connected by rail right up to Kulti lock. The section (18 miles in length) of the main canal between the branch canal offtake and Kulti will ultimately have a bed-width of 400 feet.

(c) Local services of small steamers could run frequently on the canal and trunk route and so bring the districts tapped in much closer communication with Calcutta, which would have an up-to-date inland harbour to assist in the development of industries, fisheries, agriculture, market gardening, etc. It is proposed to have fish and produce markets on the north side of Harbour No. 1.

(d) Rangoon has 14 small local services running daily to various parts of the delta.

3.—Better Sanitation.

"The eastern portion of the Manicktolla Municipality is a low-lying waterlogged area, much of the land being at the same level as the lake; in the rains this area never dries; the sanitary conditions leave much to be desired; the drainage is carried on by means of open drains, many of them *kutchas*, running along both sides of the roads, and is discharged into the salt lakes, when possible, at low tide, in the crude state. The gradual deterioration of the river (Bidiadhuri) almost entirely prevents any flow in the drains for days together in the rains, when low water level in the river is about the same as that of the land; many of the tanks in the compounds of garden houses are connected with the roadside drains, and a more insanitary arrangement can hardly be imagined" (*vide* report, page 35, paragraph 63). "Of the area which is bounded by the railway on the west, the new cut canal on the east, and the Narkaldanga road on the south, a little more than one-sixth is composed of irregular tanks" (*vide* report, page 35, para. 64). As pointed out above, much of this area is at the same level as the salt lakes. "The spoil excavated from the basin (Harbour No. 1) will be sufficient to raise the land to about 10.50 or 11.00 (level of the salt lakes and low-lying ground being 3.00 to 6.00) or to the level of high water of springs, and the result will be the removal of this low-lying insanitary area from the neighbourhood of the town" (*vide* report, page 36, paragraph 65). The modern dredger affords the means of economically raising or reclaiming large areas of land within a radius of two miles or more of the point at which the dredger may be working. The present method of filling up existing tanks and raising land in Calcutta is very costly and also unsatisfactory from a sanitary point of view, as further insanitary tanks are created in the neighbourhood of Calcutta in the course of obtaining the required earth.

ORAL EVIDENCE, 7TH DECEMBER 1916.

President.—Q. Can you give us some idea of the duties of the Advisory Committee on Water-ways?—A. They consider the important points brought before them, and advise on them.

Q. But who takes action on the advice?—A. The Government of Bengal really; sometimes Bihar and sometimes Assam.

Q. What about Assam; does this Standing Committee extend to the water-ways of Assam?—A. To a certain extent. Of course we want to extend to the higher reaches of the river.

Q. Is no body looking after that?—A. To a certain extent.

Q. If anything is wanted in the way of dredging or deepening of the higher reaches of the Brahmaputra, do your two companies do that on your own account, or does the Government do it?—A. We have done it on our own account. Sometimes we have got small subsidies from Government in connection with Dibrughur.

Q. In regard to this statement you have given us, showing the ton mileage saved by this Trunk route; what are these figures?—A. The ton mileage saving on the Trunk route is given, in 1913-14, 181 to 204 million miles. Does that mean the actual traffic or the estimated traffic?—A. The actual traffic in 1913-14 on the mileage likely to be saved.

Q. But not making an allowance for increased tonnage that would occur if you had a better route?—A. That is 300 million ton miles in the 15th year.

Q. The proposal that you want us to back is this proposal regarding the formation of a Water-ways Trust, similar to the Port Trust of Calcutta?—A. Yes, so as to get a permanent body of waterway men.

Q. And they would have their own regular engineers and financiers?—A. Yes, they would draw from special experts.

Q. Do you approve of the proposal made in this report, regarding the financing of a Trust like that?—A. I have been through the report.

Q. But do you approve of the proposals?—A. Yes, the scheme as a whole.

Q. This has the general support of the I. G. N. Co.?—A. Yes, as also that of the R. S. N. Co., and the B. A. S. Co. (Messrs. Andrew Yule's Co.).

Q. This is a fairly new estimate?—A. Last year's. It is a revised estimate.

Mr. C. E. Low.—Q. What would be the effect of the canal scheme on the cost of transport from Eastern Bengal here?—A. We save so much ton-mileage, but I cannot give you the figures as regards actual cost.

Q. In the case of 100 miles saved by this means, what would, roughly speaking, be the saving in cost of carriage, assuming other things to be equal?—A. I could not very well answer this. I could only tell you actual ton-mileage saved.

President.—Q. You are quite sure that it is going to reduce the cost of transport from here to Eastern Bengal for instance?—A. Yes, we reduce the distance in many cases to one-half to Eastern Bengal.

Q. But we want some idea of how much the actual trader is going to benefit by this?—A. It is difficult to prophesy what you have to pay for coal, material, etc., in future, but you can see the advantage, if you save half or two-fifths the distance to Eastern Bengal that the public would eventually get the benefit of it. The waterways being open to everybody you cannot make a monopoly of it.

Q. Have you any ideas with regard to the improvement of waterways away up the north-west on the Ganges; you have not included that in your statement?—A. Not in the estimate at all; that is a matter, I think, which should be taken up so that the lower reaches of the Ganges and Brahmaputra may get improved. Many of the troubles are caused by snags; they constantly change the course of the rivers and keep the channels in a turmoil.

Q. Would you put the Ganges under this Waterways Trust, as well as the Brahmaputra?—A. Yes. Take the German Rhine. It was under three principalities. Not working to a common standard and their efforts did not obtain satisfactory results. Now it is under one Chief Engineer, and they have one common standard. In the United States of America all the waterways are under the War Department (Corps of Engineers).

Q. Has your activity in the case of river steamers been diminished in recent years by competition with railways, or by the silting up of the rivers? Has the radius of action of your India General Navigation Company been diminished during recent years, or has the traffic been increasing?—A. The traffic has been increasing. It has been doubled during the last ten years.

Q. Have you relinquished any of the routes that you used to carry out in the upper reaches of the Ganges?—A. We used to run up to Allahabad at one time. That has been knocked out by the railway competition and the bad river. In my time we used to run up to Benares, but some of the channels were bad. We also ran up as far as Fyzabad, but had to give it up on account of the river Gogra being so bad.

Q. We will study these documents you have sent in, and will probably get all the information we want out of them?—A. Owing to there being so many changes amongst the officials we are anxious to get your help, your backing, as it were, as soon as possible.

Q. How many years has the India General Navigation Company been in existence?—A. We started in 1844.

Q. You have a direct connection also with the Rivers Steam Navigation Company?—A. Yes, I am representing them at this meeting. I am also the Bengal Assam Company's representative.

Q. What have your dividends been like?—A. They have been about 6 to 8 per cent. for the last 26 years.

Mr. A. Chatterton.—Q. Has the withdrawal of water for irrigation, from the Ganges, ever affected the interests of Navigation?—A. I am afraid it has. Mr. Preston said the Upper Ganges was dried up twice by the amount of water they took out in the dry season from the upper reaches. The main thing is to get special body of men to look after the rivers, as is done all over the world.

President.—Q. You want it made the business of a special body?—A. Yes. You will notice there have been very many changes in the last 25 years; in the personnel of the Irrigation Department in charge of the rivers.

WITNESS No. 118.

Mr. J. Chaudhuri. MR. J. CHAUDHURI, Bar-at-Law, Editor of the "Calcutta Weekly Notes," formerly Lecturer, Chemistry and Physics at the Metropolitan Institution, Calcutta, Director of the Small Industries Development Company, Limited, Secretary to the Indian Industrial Association, Calcutta.

WRITTEN EVIDENCE.

A change in the economic and industrial policy of Government is the first requisite for the industrial development of India. I have long been associated with the *Swadeshi* movement. This term has been much misunderstood and misinterpreted. It was started long before the partition of Bengal and was with its promoters a purely economic and industrial movement. The expression sums up in one word what should be the economic and industrial policy of the people and the Government in this country. The expression means no more than that India should be industrially and economically self-contained and self-reliant.

The War must have convinced England of the weak points in her economic policy with regard to Great Britain, its Colonies and India and there can be little doubt that after the War every economist and statesman worthy of the name, would advocate the policy of making Great Britain, the larger British Colonies and, particularly India, so far self-contained and self-reliant as is practicable. India is a continent and is very differently situated to any other part of the British Empire. India alone of all countries in the Empire may be agriculturally and industrially self-contained. If she were so, she would be a tower of strength to the Empire. If, however, the present policy of inaction is pursued and India continues to be a field for unrestricted exploitation by the rest of the world she would increasingly continue to be a source of great embarrassment and weakness to the British Government. It is not for me here to elaborate any scheme as to how India may be developed economically and made industrially self-contained. The methods which have been adopted in Europe, America and quite recently in Japan with conspicuous success are well known to those who have devoted any study to them.

I am convinced after my experience extending over twenty years that it is not possible for individuals to do much unless the Government adopt *Swadeshim* as their economic policy and make organised effort for the promotion of industrialism in this country by imparting suitable education, both elementary, technical and theoretic, and by the organisation of efficient Provincial and Imperial Departments of Industries. It will also be necessary for the Government for the development of industries to give bounties and subsidies in certain cases, advance capital or lend the services of experts in others, furnish transport facilities by regulating the railway freight, etc., and even grant protection against outside competition. Assistance in one or other of these ways may be necessary according to the conditions of particular industries and also having regard to the surrounding circumstances.

It would be difficult to lay down any definite rules regarding State assistance to industries generally. One or other of the modes of assistance suggested in question 5 may be given according to the nature and conditions of the industry. The Provincial Board may make suitable recommendation on this behalf and the Government may act on such recommendation.

Capital.

So far as the raising of capital with regard to indigenous industrial enterprises is concerned, my experience is, that it is mostly contributed by the educated middle classes. There are some zamindars (big land-holders) and capitalists who also look upon industrial enterprise with favour. Those who do so are generally better educated and more enlightened than their brethren. But very few zamindars in Bengal have ready cash. Many of them have to maintain a host of dependents and relatives. Some of them over and above that cultivate extravagant habits and the luxurious ways of life of both an oriental and occidental nobleman. Many of the members of the English aristocracy whom I met at Oxford are like ordinary commoners in their habits and in their aims and objects in life, although most of them are much richer than even the biggest zamindars of Bengal. It is through want of the right sort of education and training in early life and the absence of any definite aims and aspirations in later life that our zamindars become an easy prey to a lot of parasites and much of their money which may be turned to useful purposes thus runs to waste.

A very large amount of money also passes through the hands of the Bengal *ryots* specially in Eastern Bengal. But they are not frugal either. It is education alone that will enable them to make better use of their money than they do now. When we remember that the Suez Canal was excavated by Ferdinand Lesseps with capital chiefly raised from amongst French farmers, it is not unreasonable to expect that with the imparting of suitable education, the vast amount of money that annually passes into the hands of the Bengal *ryots* from jute, etc., may one day be available for the development of industries in Bengal and elsewhere. The ordinary capitalist classes in Bengal, though very frugal and even miserly in their habits, are very conservative as a rule and are loth to employ their money outside the groove of their hereditary trades, or invest it except in loans and mortgages and purchase of landed property. Education and culture may widen their views and interest in other directions. But I have found in recent years that the better class of Indian traders in imported articles such as chemicals, paper, leather and hardware, etc., are willing to come forward with capital provided they get proper guidance and expert assistance for the manufacture of the articles of trade in which they deal.

With regard to the Government pioneer factories and demonstration factories, such as those started by Mr. Chatterton in Madras and by Mr. Hadi in the United Provinces they have served useful purposes in their own line. I got Mr. Hadi to give his sugar demonstrations at the Calcutta Industrial Exhibition of 1906-1907 and I received a lot of enquiries from different parts of Bengal regarding same. But the difficulty in Bengal is that sugar cane is cultivated in comparatively small plots of land here and there and the present state of its cultivation would not go to feed a factory even on a moderate scale. I have suggested a remedy for this under "Land policy." When pioneer and demonstration factories can be shown to work at a profit, they should certainly be handed over to the public. I am opposed to Government engaging itself in any permanent enterprise except in the opening out of railways and waterways and in the manufacture of arms and ammunition. Pioneer factories.

With expert assistance and Government co-operation various industries may be improved and established in Bengal and other provinces as well. Amongst others the industries which may be developed in Bengal are hand-loom weaving, sericulture and silk weaving, woollen goods manufacture, dyeing, bleaching, calico printing, hosiery, lace-making, manufacture of trimmings for dresses, ribbon and tape making, rope making, fancy basket, wicker-work and straw hat making, toys and other fancy things, tanning and leather manufacture, enamelling and metal manufacture, umbrella manufacture, the manufacture of electric fittings and other requisites, pottery, glass and hardware manufacture, guttapercha and rubber manufacture, oil cloth and imitation leather manufacture, bone, shell and celluloid button and comb manufacture, paper pulping and paper manufacture, stationery manufacture, manufacture of sugar and its bye-products, oil extraction, perfumery, tobacco-curing and the manufacture of cigars and cigarettes, dairy products, fruit and fish preservation and culture and chemical industries generally. Government aid.

The cottage industries in Bengal will die out, in course of time, if they are not taken in hand at once. To take the commonest of them, hand-loom weaving seems to be in a bad way. The industry is getting gradually confined to the manufacture of *dhoties* and *saris*. Many years ago I noticed that the weavers, specially in Eastern Bengal, had taken to manufacturing coatings, shirtings, sheetings, towels, dusters, napkins, etc., which are made from coarser counts of yarn but since the wane of the *Swadeshi* movement this branch of weaving industry in Bengal seems to have undergone a decline. While the *Swadeshi* sentiment furnished a sort of protection yet this decline cannot wholly be attributed to a decline in the sentiment. The Bengal weavers cannot compete with the cheap mill products on the one hand, and the better finished Continental cotton tweeds on the other. The Punjab (Ludhiana) cotton shirtings and coatings are as a rule better finished than the Bengal stuff. The Madras stuff chiefly supplied through some German Missions were in great demand in Bengal. These were no doubt much more expensive but they always commanded ready sales. When the German Missions used to manufacture them in India through Indian labour, I see no reason why under State guidance the same class of things cannot be manufactured in the Nadia, Pabna, Faridpore, Dacca, Mymensingh, Chittagong and Comilla districts in Bengal. The same may be said of sericulture, tanning and other industries.

With regard to cottage industries, it would not be enough to reorganise them. A great deal of technical advice and training will be required to make them hold their own against competition. The weavers must be taught to improve their methods of dyeing, sizing, bleaching and finishing. A central place for warping and sizing and dyeing the yarns on a co-operative basis at weaving centres will go a great way to improve the articles with the result that they will always find a ready market. With regard to each of the industries I have mentioned above a great deal may be done by a Provincial Director of Industries assisted by an efficient Board.

As in the larger industries, so in cottage industries, success can only be attained by technical efficiency acquired through training under proper guidance and organisation.

With the help and assistance of the late Maharaja of Maurbhanj I worked for about three years and matured a scheme for the establishment of a paper mill in the Maurbhanj State, from the forests of which *sabai* grass may be had in abundance. We had a survey made of the grass areas and sent consignments of the grass to Europe for obtaining tenders for the most suitable type of machinery after experiments with the raw material sent. We received

tenders of machinery from some leading Scotch firms, some German firms, a leading Swiss firm and many American firms. The tenders of a Scotch firm, a German firm and a Swiss firm were most suitable for our purposes. The Continental firms had our grass converted into paper and sent the manufactured paper to us. We found the paper to be of excellent quality and very suitable for book-work.

A representative of the Scotch firm came to see me at Calcutta after supplying some bamboo pulping plant in China. He advised me that bamboo would be the most suitable material for preparing pulp for paper manufacture in India. Bamboos of two years' growth would give excellent pulp and the paper manufactured from it would be strong in texture and light in weight. The paper may be of slightly creamish tint but would be very decent in appearance. I was told that bamboo-pulp paper was being manufactured then in China. About six lakhs of rupees would suffice for the setting up and working of a bamboo pulping plant in any locality where bamboo is available in abundance.

We came to the conclusion from the tenders we received from the Scotch and Continental firms that a paper mill for preparing paper from *sabai* grass may be started and worked with a capital of 15 lakhs. Unfortunately the Maharaja died at that time and the scheme fell through.

My idea is that bamboo pulping plants may be set up with advantage in Eastern Bengal, Assam and Burma. As they must be located on river-side, cheap water carriage would be available for transporting the pulp to Rangoon or Calcutta and paper mills may be set up in these commercial towns where the manufactured paper would find ready market. Paper is selling now at famine prices. With Government assistance surely such industries may be promoted. Some of the enlightened Indian princes are very keen on promoting such industries for benefiting their subjects.

Financing agencies.

If co-operative banking societies may be suitably organised throughout a province and a central bank may be established at its capital, the banking facilities for industries will greatly increase. But the organisation and supervision must rest with the Government.

Should there be a Provincial Director and a Board of Industries, they might in suitable cases recommend the financing of particular industries or factories either out of Government funds or through specially organised banking agencies such as central or local co-operative credit banks, on sound business lines. Government can borrow at a much lower rate of interest than private individuals and they will be able to grant loans at easier rates of interest and on more favourable terms than existing banking or money-lending concerns. Government may also with little risk advance money to manufacturers who turn out articles of which the Government is a large purchaser.

The Director of the Board of Industries will of course have to be satisfied about the quality as also the capacity of the factory to turn out the requisite quantity. In such cases advances may be safely made against the output which the Government may take over in repayment or liquidation of loan. Machineries on the hire-purchase system may be supplied by Government to suitable industries on the recommendation of the Director and the Board.

Co-operative societies amongst weavers, metal workers and people engaged in other cottage industries are essential for their existence and improvement.

Government certificates of quality especially with regard to chemical industries, iron and metal manufacture, and various other articles regarding which it is possible to grant such certificates would surely serve a very useful purpose.

Limits of Government assistance.

I would not put any limitations on Government aid to a new enterprise if it competes with any established external trade. Where a fresh private enterprise may be demonstrated to cheapen the cost of production and price of articles, Government aid may be granted even if such industries would go to compete with existing ones. But where over-production would lead to the curtailment of normal profits, it would not be desirable to grant any Government aid.

Technical aid.

Loan of Government experts may be given to help private firms and companies to remove difficulties or defects or economise the process of manufacture or to improve the method employed. The help may be given gratuitously or for a charge agreed upon. If the process is a speciality of any firm or company, the result of the researches at the latter's expense should not be published except on such terms as may be pre-arranged between the firm and the Government. If the process is common to many similar industries, the result should be published.

Research abroad.

The researches with regard to Indian industries should be carried on wholly in India. The researches abroad may be communicated to the Research Institutes in India and references may be made to Research Institutes abroad when necessary, but no such Institute should be maintained by India outside the country.

Surveys for industrial purposes.

Further surveys may be carried on by Indian students after post-graduate or other suitable training under the guidance of appropriate Government Departments. The results of surveys should be published by Government in English and vernacular.

Commercial museums.

The mere formation of commercial museums or emporia or even sale agencies in the principal towns of India and outside India would not be of much good unless the persons in charge of such museums, emporia or agencies are in a position to give suggestions on lines that would make products of 'unorganised cottage industries' readily marketable. Mere

display of the products of Indian cottage industries in foreign countries will only enable the more efficient operatives in those countries to produce cheap imitations and deprive the Indian handcraftsmen of their bread.

My experience in connection with Indian industrial exhibitions has been that it helps the enterprising foreign businessman more than the Indian craftsmen. Exhibitions in which more economic and improved processes are demonstrated, useful machineries and their use are displayed are more profitable to this country. The Government should help and assist in the organisation of exhibitions of this kind periodically. Exhibitions should be popular in character.

The appointment of trade representatives either outside the province or abroad pre-supposes manufacture on a larger scale and in the present state of the industries, they will not be of much use. Trade representa-
tives.

The publication of a list as also exhibition in the commercial museum of imported articles used in the Government departments including the railways, and the Army clothing, equipment and supply departments would be very useful to Indian manufactures. When Provincial Boards of Industries are established, they should be consulted regarding the purchase of Government stores. Their recommendations regarding the purchase of stores in India should be acted upon by the Government departments. Government
patronage.

It will be of great assistance to some industries such as match factories, pencil factories, tanning and some chemical industries such as the manufacture of methyl alcohol, etc., if the Government would supply wood and other forest produce on favourable terms. Forest administration requires revision on business lines. Supply of raw
materials.

I took prospecting lease of forest produce of the Maurbhanj State for three years and collected and exported such produce to England, America and Germany. It would be more profitable if they could be put to industrial use in this country. The lease terminated on the death of the Maharajah.

The tenants' rights secured by the Bengal Tenancy Act do not afford much scope for carrying on agricultural operations on a large scale, nor for the development of industries dependent on agriculture, such as sugar, etc., on a commercial scale. But it would not be practicable or even politic to interfere with tenants' rights for the prospective development of agricultural industries. The remedy lies in organising co-operative societies amongst the tenants for such purposes. For instance, sugar on a commercial scale cannot be manufactured profitably unless large tracts of suitable land are put under cultivation for the purpose. By co-operative organisation not only may this be done but capital may be secured and plants may be obtained and worked. The Government may also advance loans and supply machinery on hire purchase system in such cases. Land policy.

Where Government owns *khas* land, it may grant lands on favourable terms for the establishment of new industries or the development of existing ones.

The existing provisions of the Land Acquisition Act furnish sufficient scope for the acquisition of land for industrial companies. I would not make the powers conferred under the Act too lax. But Government may be empowered to acquire land for pioneer or demonstration factories. As "public purposes" are not defined in the Act, I presume no court of law would interfere with the discretion of Government if it declared such purposes as public purposes. If any doubt is entertained with regard to this matter, a suitable provision may be made in the Act to remove the doubt. Land acquisition.

I am of opinion that to increase the efficiency and skill of labourers generally, it is necessary to make them go through a course of elementary general education early in life and supplement it by a course of technical education according to locality, the occupation of the boys or their aptitude for any particular kind of work. Training of labour.

Free and elementary primary education for the boys and girls of all classes and supplemental technical education are absolutely necessary for the industrial development of the country.

Factories and workshops in India are reluctant to take apprentices except for their own requirements. So their usefulness as training institutions is almost nil in this country. Technical schools can alone meet the general demand for industrial education. Apprenticeship
system.

I have found Bengalee youths particularly quick in acquiring technical knowledge of the working of even complicated machinery.

I believe, I was the first in Calcutta to introduce the Linotype composing machines in the printing press I have to keep for publishing the *Calcutta Weekly Notes* which I edit. The difficulty that confronted the then Agent of the Linotype Machinery Trust was the difficulty of getting suitable operators. I got some very young but smart compositors apprenticed at the Linotype office. They not only turned out to be good operators but mastered the details of the working of the machine within three months. These boys had just enough school education to be able to read, write and spell fairly well. I found that boys of the better castes turned out to be as efficient as those who belonged to the mechanist class. The Trust advised me to employ two of my trained men as operators and a mechanic for looking after the machines. But after a short time I found it unnecessary to keep a mechanic. The operators were as efficient in looking after the machinery parts as the mechanic. Ever since then I have not kept any mechanic and the machines have always worked without

any hitch. I was also told by the then European foreman of the Trust, that the record of the boys as operators did not compare unfavourably with first-class operators in other parts of the world.

I found at the same time that men of much maturer age, who were very fast hand-compositors, did not turn out to be successful operators. The best results I obtained were with youths of about 20 years' age.

In the pencil factory of which I am a Director my experience has been the same. There I found that boys with a fair amount of education supplemented by some technical training at the Bengal Technical Institute, turned out to be very efficient foremen and boys of the class used to manual labour turn out under such supervision to be very successful operatives. The same has been my experience with regard to some hosiery factories both at Calcutta and in the mofussil, Pabna for instance. I and some of my friends had also got some Bengalee youths apprenticed at weaving and spinning mills at Nagpur, Rewar and Ahmedabad and every one of them proved a success. But Bengal does not yet afford sufficient scope of their employment in the province. A graduate in chemistry whom I got apprenticed at the Empress Mills, Nagpur, after learning all that could be learnt there, obtained a State scholarship and had further training in England and returned home recently. I do not know if he has been usefully employed. Another under-graduate whom we got apprenticed at Messrs. Fielding and Platt in England in their mechanical department, after receiving practical training as a mechanic later on got apprenticed in some Dundee Jute Mills where he qualified himself both in the weaving line and also in jute mill machinery and finally obtained the degree of B. Sc. at the Manchester University and won gold medal at the City of London Guilds Examination in jute weaving, etc., but after seven years' training in England he cannot find employment in this country because of his Indian nationality. Instances of this kind may be multiplied from every province in India.

How far industrial education to replace literary education.

In addition to the establishment of special industrial schools, it would be desirable to provide evening classes for boys who are already employed in industries. Primary education should be compulsory for all boys and the above schools and classes should be supplementary. Now the only system of education which obtains in this country is literary or university education. In the absence of any form of practical education all flock to ordinary schools and colleges. But these cannot give a career to all. Many after passing through the grinding of the university up to the age of twenty or more, go out in the world without any business ideas or practical training and look upon life as a blank. It is absolutely necessary to draw out a large section of our youths from the schools and put them to some practical training which will give them employment and occupation in life. I would fix the ordinary school-leaving age at 12 and then put them to some school where they may receive technical training with so much of theoretical training thrown in as would expand their mind and intellect.

I would place the primary schools under the general Education Department of Government but would have a separate director for the industrial schools. The industrial schools should be placed under the supervision of the Provincial Director of Industries and the Board. The Provincial Government shall be the only connecting link between the two Departments of Education.

Skilled managers, etc.

In order to train skilled managers and supervisors, people who have received some training in the line or are engaged in the business or private firms may be given help or sent out on deputation for study or special enquiry in other countries.

Female education on practical lines.

I also believe that by the spread of female education on practical lines and by training women for carrying on home industries, such as the manufacture of hosiery and other knitted articles, lace making and the making of trimmings, etc., they would be able to supplement their husbands' earning and also maintain themselves during widowhood. Women of all classes used to manufacture yarns and were in fact the backbone of weaving industry in India. The spinning mills have deprived them of a profitable occupation and they may even now take to useful cottage industries, if the necessary instructions are imparted to them through female teachers specially trained for the purpose. Some amount of education and training would increase the efficient and scope of female labour generally.

Official organisation.

In my opinion there should be a Director of Industries in every province and specially in Bengal. The Director for Bengal should be a man well versed in chemical technology and should be assisted by some specialists in special branches of textile and other industries for which Bengal offers special scope for development. If it be not possible to engage a number of specialists to form an efficient Board of Industries, an Advisory Committee composed of men of experience and influence may be formed to assist the Director.

This Board or Committee may be composed of official and non-official members, the former being selected from the agricultural and such other special departments who may combine special knowledge regarding some branch of industry with a knowledge of the special circumstances of the province in relation to such industries. The non-official members are also to be selected on the same principle; men of general education with a scientific training and some business experience would be very serviceable on such Boards.

In the Provincial Board for Bengal there should be men who can not merely give advice but organise and promote industries for which Bengal offers special opportunities. I am of opinion that it is very desirable to have an Imperial department of experts not merely with

regard to the larger industries but also in connection with industries generally. The Imperial department should consist of specialists only.

For instance, I have said that the Director in Bengal should be a man well versed in chemical technology. But he may not necessarily be a specialist in agricultural chemistry. Chemistry is such a vast subject that it is impossible for one man to master all the various branches of its technique.

This is where I think the usefulness of an Imperial department comes in. In the Imperial Department there may be more than one specialist in chemical technique.

Imperial
Department

(a) For instance, there may be an expert in agricultural chemistry, there may be one who may be an expert in the manufacture of dyes and another capable of advising the Provincial Directors regarding the manufacture of acids, alkali and other chemicals on a commercial scale. I am of opinion therefore that the Imperial Department should have several chemical experts attached to the department.

(b) An expert in leather and hide industries would also be useful.

(c) For glass-making experts in the Provincial Boards would be more useful.

The same with regard to—

(d) sugar and

(e) oil seed industries.

I would suggest that there should also be an expert electrician and expert metallurgist attached to the Imperial department. The Imperial department may be organised under an expert scientist and all his expert advisers need not be centralised in one place but may be located in places which offer special facilities for their usefulness and for the carrying out of experiments or researches. Their opinion may be sought when required.

The function of the Imperial department should be investigated, research and advice in connection with the work of the Provincial Boards and also the co-ordination of Provincial efforts. The Imperial department should be provided with laboratories and museums or experts of the department should be located in places where these facilities are available. The museums and laboratories need not be centralised in one place but may be located in places which offer special facilities for investigation and research.

To start with, there might be a Director for each province assisted by one or more experts to assist him in drawing up schemes for the promotion or development of any particular industry for which the province may offer special opportunities. For instance, the manufacture of paper and the obtaining the pulp from bamboo or suitable wood or some substitute for it should immediately engage the attention of the Governments of Bengal, Burma, Assam and the United Provinces. The same may be said of glass. Other industries, some of which I have already indicated, may be similarly developed under the guidance and direction of a Provincial Industrial Department.

Provincial
organisation.

The department may engage experts when necessary. But the Provincial Director should ordinarily have an Advisory Committee and this committee should form a connecting link between the Director and the people. In the Advisory Committee there may be some Government officers who are well acquainted with the existing conditions of some of the more important industries (such as agriculture, weaving and sericulture), some scientific men who are interested in industries or are engaged in research in their connection, some representatives of the capitalists and the landholding classes and some representatives of the educated middle class. The Advisory Committee should not be larger than a body of seven. But sub-committees of co-opted members may be formed for special industries or special purposes or for local areas. A member of the Board may preside over the sub-committees when necessary. The Director and his Industrial Board may be located in the capital of the province but in addition it is very desirable to have also local consultative committees in the mofussil. The Director and his Board should try to create an industrial spirit in the country and if they can do this both capital and enterprise will be forthcoming.

The Provincial Director of Industries should have a seat in the Provincial Council and should budget for grants, subject to the sanction of the Council. Power should be given to Provincial Councils to float provincial loans subject to Imperial sanction.

If the Imperial department consists of specialists, the provincial department will seek their advice or assistance when necessary and also obtain through the Imperial Department information as to what is being done in other provinces and in other countries. The Imperial department shall have a specialist department and also an information bureau and a special Statistical Department. All information regarding marketing products should also be available from this department.

There is no scientific and technical department at work in Bengal worthy of the name. Technical and scientific departments.

In order to aid industrial development it is obviously necessary to organise an Imperial Scientific and Technical Department. It should work hand in hand with the Imperial Department of Industries and the Provincial Boards. The Imperial Scientific and Technical Department should be under a scientist of European reputation, well-versed in scientific technology. His department must be a part of the Imperial Department of Industries. He should be in

direct touch also with the Education Member of the Government of India as also with the Directors of Public Instructions in the different provinces.

Technological research institutions should be established in every province and should be attached, if possible, to technical colleges in the capital of each province.

In Bengal the college of science may be fitted up with laboratories which may serve the purposes of a research institute. A technological college should also be established by Government, properly equipped, on the lines proposed by the Hon'ble Mr. Lyon, regarding which nothing has been done since his announcement.

The technical college in Bengal should aim at the development of technical industries, which in fact form the backbone of other industries. The electrical industries and other industries for which Bengal is especially suited, some of which have already been mentioned by me, should receive special attention there. Each institution of the kind should be allowed to develop in each province on some lines specially suited to the province.

With regard to research institutions, the co-ordination of work and results may be secured by the publication of journals in which the particulars of research as also the results may be published.

Colleges attached to the universities should also be encouraged to carry on research work. Even if there be some overlapping of activities in this direction, it would have beneficial results than otherwise.

It would be premature and undesirable now to confine the research activities of the technical department, technological institutes, colleges and universities to particular grooves. Specialization will come in course of time. At present the general spirit of investigation should not in any way be checked.

A college of commerce in each province will not only assist Indian industries but will encourage a spirit of commerce with foreign countries. Such colleges besides giving business training may serve to train a body of men who will be found of great service in the management of companies, banking concerns and firms engaged in foreign trade.

Statistics, journals
and monographs.

The department for the collection of commercial intelligence should be a branch of the Imperial Department of Industries and this department should directly collect, tabulate and edit industrial statistics.

It would be beneficial to establish or assist 'general' industrial journals in the vernacular languages. But before the introduction of technical training on a large scale special industrial journals will not be of much good.

Monographs of Forest and Geological Departments have, to a certain extent, been taken advantage of by enterprising men in developing jungle products, sericulture, mining industry and the like.

Certificates of quality.

For chemicals which are used as medicines and articles of prepared food, certificates of quality should be compulsory. For other manufactured products and articles it should be left to the option of manufacturers to obtain certificates.

Prevention of adulteration.

Penalties for adulteration should also be confined to articles of food and medicine.

It is very desirable to make legislative provisions for the registration of partnerships and the disclosure of names of partners.

Hydro electric
power, etc.

Waterfalls in the Darjeeling District, in Hill Tippera, in Chittagong District, in Maurbhanj and in Ranchi Districts might be utilized for generating hydro-electric power. The late Maharaja of Maurbhanj consulted some leading electric engineering firms in England regarding the saddling of some water-falls in his State for supplying electric energy to Calcutta for manufacturing purposes and the project was considered as quite feasible by experts.

Railways and waterways.

Railway freight does to a great extent interfere with the success of many local industries. There should be a special manufacturer's scale of freight. For instance, pencil and match factories in Bengal have not flourished partly because of the difficulty of getting suitable kinds of wood from the hills or from a distance. We have found it more convenient and less expensive to get wood for pencil from East Africa, than from any of the Indian forests.

Waterways.

Waterways formed, before the advent of railway, the chief means of communication and transport in Bengal. Most of the offshoots of the big rivers in Bengal become unfit for navigation even for small boats during the summer owing to their sources being blocked by the deposit of sand and mud after the flood (rainy) season. It is possible to store up some of the huge quantity of water that unprofitably flows into the sea annually and also to open up the sources of the minor waterways and utilize them all through the year for purposes of cheap transport. They would not compete with the railways but would serve as feeder lines. This would benefit the agricultural population greatly. Cart transport to railways is very costly and takes away a large percentage of the profits of the producer. There should be a special department of either the Local or the Imperial Government for improving the waterways of Bengal. The improvement cannot be effected from provincial revenues but must be done with borrowed capital which may be made to yield handsome returns to the people and the money so invested. The offshoots of the Ganges (Padma) in Bengal may all be made navigable. Many of them have been killed by reckless public works and railway engineering.

The expert report recently published by Government shows that. Many of the waterways in Bengal have got silted up through accident and neglect. The injudicious putting up of embankments, the sinking of heavily laden barges or fall of big trees at the sources after storm or bamboo and mat or other obstructions put up for fishing purposes when the water goes down after the monsoons, have gone to silt up many minor streams in Bengal at their sources of supply from the big rivers. The offshoots of the Ganges which might with advantage be restored to navigation for minor crafts all through the year are :—

The Bhagirathi (river Hoogly), the Bural which rises at Sardah (Rajshahye) and flow into the Brahmaputra at Bera (a great jute mart) and which is a great short cut for country crafts from East Bengal to West Bengal, the Ichamati below Pabna, the Nadia rivers (Jalangi, Mathabhanga-Churni, Ichamati and Bhairab branching off through Nadia and Jessore Districts), the Kumar and Chandana which flow through Faridpur district, all of which take their rise not far above the Sara bridge, Eastern Bengal State Railway; the Gorai which takes its rise a little below the Sara bridge to the west of Pabna; all these rivers used to give not only good drinking water to men and cattle but also great transport facilities to ryots both in Deltaic Bengal and in North Bengal.

(Note.—Witness did not give oral evidence.)

WITNESS No. 119.

HON'BLE RAI SITANATH RAY BAHADUR, *Merchant and Banker, representing the Bengal National Chamber of Commerce.*

Hon. Rai Sitanath Ray Bahadur.

WRITTEN EVIDENCE.

Q. 1.—I have had some experience of raising capital for one or two industrial enterprises. True it is that the Indian capital is somewhat shy and requires a good deal of coaxing for investment in industrial enterprises, but about eight or ten years before, when there was an outburst of enthusiasm for industrial enterprises, and in cases where promoters were well known personalities or men of standing and character, the difficulty was not so acute in raising capital for industrial enterprises. But the difficulties multiplied after the failure of the several Indian managed enterprises, especially after the failure of the Indian banks. Capital for industrial enterprises came from all classes of people; a large amount came from the middle educated classes, and some even from people of limited means. The difficulties that are now-a-days met in raising capital are as follows :—

Capital.

- (1) Want of faith in the efficiency of management and want of expert knowledge on the part of managers.
- (2) Too many restrictions placed on the formation of a limited company by the amendments made in the new Companies Act, chiefly the material curtailment of time within which a limited company should be registered and material curtailment of time within which share-lists should be closed.
- (3) The important trades of this province are jute, rice and coal. A very large amount of money is required in financing these trades and the share of the indigenous capital in financing it is considerable. What remains of the capital in the hands of the large capitalists is invested in land which offers a more tempting security in this province. To them therefore industrial enterprises even with prospective high dividends, offer very little inducement for investment especially because of the risks and uncertainty involved.
- (4) Disinclination of the several banks to give financial assistance or loans to Indian managed companies, however good and sufficient the security offered may be.

The difficulties in raising capital may be removed and Indian capital to some extent, may again be drawn or allured to industrial enterprises in the following ways and under the following conditions :—

- (1) Soundness of the enterprise, that is, whether the enterprise would be commercially profitable.
- (2) Loan of the services of Government experts on favourable terms.
- (3) Efficiency of management, that is, the management should be conducted by one who has practical knowledge or experience of the enterprise.
- (4) Guaranteeing dividends for a limited period; the condition of guarantee is essentially necessary in view of the fact that capitalists now-a-days do not experience much difficulty in investing their money on good security, that is, on the security of land.

In view of the security furnished by lands, capitalists cannot be easily induced without guarantee to invest their money in industrial enterprises which involve an element of risk and uncertainty. Of course provision should be made for subsequent refund to Government of the

expenditure incurred in paying dividends at the guaranteed rate, with powers to Government to make concession whenever it deems it fit.

- (5) Another suggestion that I have to make in this connection is the establishment of a large industrial bank in every province, that is, in the provincial capital with branches in all important centres of trade and industry.

It is a painful fact that industrial enterprises under indigenous management do not get the usual banking facilities from the several banks which are all under foreign management and without banking facilities it is not possible to develop industries.

Q. 2.—Large industrial enterprises in this province are mostly conducted with foreign capital. The middle classes of the province and some of the large capitalists have been recently subscribing to industrial enterprises especially to light railways guaranteed by Government and individually starting industries on a limited scale.

Government assistance.

Q. 5.—I heartily approve of the following methods of giving Government aid which will go a long way to develop existing and new industries. With the exception of the methods described in clauses (1) and (6), the other methods will readily commend themselves to all of us.

Guaranteeing dividends for a limited period is one of the best forms in which financial assistance can be given to existing or new industries. This will help to draw capital from other channels of investment to industrial enterprises. In Bengal on account of the uncertainty and risk incidental to industrial enterprises, a large amount of private capital is invested in land; so guaranteeing of dividends for a limited period may induce capitalists to invest their money in a large measure in industrial enterprises. It is reasonable to make provision for subsequent repayment of the expenditure incurred in paying dividends at the guaranteed rates. What I mean is this, that when an enterprise or an industrial concern has shown profit enabling it to pay dividend at a certain reasonable rate then the surplus profit after providing for reserve should go to repay Government money. I do not approve of giving Government aid by money-grants or by subscription of part of the share capital.

Besides guaranteeing dividends for a limited period, loans should be advanced to industries generally with interest on easy terms but in particular and exceptional cases, short or temporary loans may be granted for a limited period without interest.

To my mind it is not desirable to offer any money grants-in-aid or even loans without interest, or indiscriminately to guarantee dividends, without provision for repayment of the expenditure incurred for guaranteeing dividends, as too indiscriminate generosity in a matter like this may lead to the growth of unsound enterprises.

Sub-clause (5)—Supply of machineries and plants on hire purchase system would considerably help the development of cottage-industries, where the value of machinery is small and the variations in the prices of different makers are negligible. But it has to be seen how far this system can be made profitable in the case of large industries where the value of machinery is very large and the quality and the price of different makers greatly vary.

Sub-clause (7)—It would be a great incentive to the promotion and development of industries, and it will indeed be of substantial help to many industries, if the Government would undertake to purchase the products of certain industries for a limited period. It would help the industries to grow and eventually become self-supporting.

Q. 6.—In the case of Government guaranteeing dividends, some control is necessary to ensure good and economical management. These powers may be exercised by a competent officer being placed in the Board of Directors. In the case of a loan, the Government should have full knowledge of the actual state of affairs of the company concerned; this may be had by periodical auditing. In my opinion, Government control by the appointment of Directors should only be provided in cases covered by clause 3.

Pioneer factories.

Qs. 7 and 8.—It would indeed be a great encouragement to private enterprises and private capital if Government were to take the lead in establishing pioneer factories thereby demonstrating to the people whether a new industry would be commercially profitable. The utility of Government pioneer factories has been as reported, demonstrated in Java, Sumatra and elsewhere. In Java and Sumatra, the unique development of the sugar industry has been solely and wholly due to the establishment of pioneer sugar factories by the Dutch Government, where the Government not only provided the necessary plant but set up several sugar factories and provided working capital for their management. This continued to be done until the factories were in a position to show profit and it was after these factories had shown profits that they were made over to private capitalists. It is not possible for private capitalists with their limited means, as is the case in this country, to set up factories solely for experimental purposes. It is only a big Government like ours which can and should allot a certain amount of money every year for setting up experimental and pioneer factories for the development of industries.

The industries which offer prospects but which have not been already undertaken to any large extent and which are not likely to be undertaken in the near future, should be tried by Government by opening pioneer factories. When a pioneer factory has grown to be commercially successful, it should be handed over to a private capitalist or company when fully convinced of the capacity of the party for properly conducting the concern. A pioneer factory

should be closed or sold when a sufficient number of private or company-managed factories have grown around and proved successful. A pioneer factory should also be closed when it is found impossible to make it commercially successful.

Such pioneer concerns should alone be converted into permanent Government enterprises when there is no chance of private parties venturing to undertake such enterprises and when such industries are essential either for Government purposes or for purposes of public utility.

In this province the following pioneer industries may be undertaken with advantage as there are abundant raw materials available for them: sugar, glass, chemicals, alcohol, hardware, and matches.

Successful pioneering experiments should not be converted into permanent Government enterprises, but they should be made over to private capitalists or companies after they have shown a profit and more especially after the Government is satisfied as to the capacity of the private capitalists or companies successfully to carry on the work of the pioneer factories.

Qs. 9 and 10.—Excepting to some extent the industries started by Indians individually, where they generally limit the scope of their operations within their financial means, industrial enterprises under indigenous management are extremely handicapped for want of proper banking facilities in this province. Financing agencies.

Most of the joint-stock concerns recently started have not only suffered from bad management but also for want of financial assistance from the existing banks in the country. They therefore have to raise money by loans from private capitalists who, having no ready means properly to value the security,—the machinery and the plant,—give loans with much precaution and at a high rate of interest. This is generally the condition of industrial enterprises under Indian management in this province. There are no reasonable grounds to expect that the existing banks here will change their ways and readily offer proper banking facilities to Indian enterprises. Even then, it will be highly desirable to establish industrial banks in all important centres of trade and industry without which it will be vain to expect any great industrial development here.

The functions of these banks should be amongst others to advance loans to indigenous enterprises on their stock-in-trade and products, to stand guarantee for them in procuring materials and plant and machinery on credit and also to stand guarantee for merchants to whom the manufactures of those enterprises may be sold or given for sale on credit.

Q. 13.—Government should not lend its support or give financial assistance to any enterprise which would compete with or any way hamper or discourage existing, or fresh private enterprises. Where private enterprises have already succeeded Government should stand aside. Limits of Government assistance.

To prevent Government aid from competing with existing or discouraging fresh enterprises, the following precautions may be adopted :—

- (1) Aid should be given to existing industries or to fresh enterprise only when such industries show possibilities of great development with such aid and when there is no likelihood of any fresh private enterprise being undertaken without aid.
- (2) Government should have power to regulate the price of the produce of an aided industry with the object that the produce of such an enterprise may not unfairly compete with that of an unaided one.

Q. 14.—When an industry is capable of being considerably developed in India and finally placed on a sound economic basis, there should be no limit to Government aiding such an enterprise whether it competes with an established external trade or not.

Q. 20.—Demonstration factories will be of great help in inducing people to take to industrial undertakings and in giving them a proper idea how best to work the different factories. The people are quick to appreciate advantages of improved methods and will readily adopt them, provided they are convinced of their usefulness which cannot be better done than by demonstration. Demonstration factories.

The organisation that may be established for the industrial development of the province should consider the industries for which demonstration factories might be profitably established. It appears that it may be so done in a large number of cottage-industries, such as, cotton and silk weaving, brass work, bamboo and mattress work, moulding and modelling, and tile making.

Qs. 28 and 29.—Commercial museums with complete arrangements for showing the process of development of suitable articles both indigenous and foreign and the raw materials necessary for their manufacture with indication of the places where such materials are available, and the quantity available, should be established on a proper scale in commercial and industrial centres. Business-men, commercial and industrial, should be associated in a board of management. The commercial museum established in Calcutta does not conform to those conditions. Commercial museums.

Qs. 31 to 33.—From a very long time and even now periodical Melas held all over the country, such as Sonapore Fair, Kissengange Fair, and Kartickbarni Fair near Munshigange, serve the purpose of exhibition and sale, where a considerable amount of trade is done, supplying the requirements of the respective localities, carrying their superfluities and creating markets for new commodities. The Indian Industrial Exhibition that is being held every Exhibitions.

Government
patronage.

year has given considerable impetus to some industries by bringing their productions into prominence and making them popular. Government should always encourage and help the holding of exhibitions like those mentioned above and should themselves also organise exhibitions in a comprehensive scale periodically. They should be popular in character.

Qs. 37 and 38.—Before purchasing stores from outside, it would be better to advertise in the papers inviting local tenders for the supply of stores respectively required by the several Government departments.

It will certainly be of much help if the Government departments which use imported articles were to publish lists of those articles with their quantity and prices and circulate them free to commercial associations and manufacturing firms and also exhibit the articles in commercial museums. Such action will give useful guidance to industries. With regard to Government purchase, it is very desirable that the Government should make their purchases, whenever possible, locally.

Land policy.

Q. 43.—The Land Acquisition Act having been amended authorising Government to acquire land on behalf of public companies, I do not think it necessary to make further changes in the law.

Training of super-
vising and technical
staff.

Qs. 51 to 53.—There should be technological colleges in different important centres for the training of young men with a view to turn out competent supervisors and managers to conduct industrial enterprises. The most competent amongst them should be helped with scholarships and the influence of Government should be exercised for their admittance into technological institutes and factories in foreign countries. This would enable them to acquire practical experience and study conditions and methods abroad. Concessions on these lines should also be made to competent men in suitable private enterprises in acquiring experience of foreign methods when found necessary. Government aided factories should be required to take in apprentices with proper safeguards for protecting their own interests and to train technical experts. For this purpose it will be necessary to undertake legislation. The railways both under State and company management should take in Indian apprentices in their workshops more largely.

Official organisa-
tion.

Qs. 57 to 62.—An organisation on a comprehensive scale is necessary for the development of industries. It would be expedient in the first instance, to appoint an Advisory Board of Industry and Commerce in every province, which should hereafter be developed into an executive body with budgetted funds and statutory powers which should be determined in the light of the experience gathered from the working of the Advisory Board.

There should be a Director of Industries with a staff adequate for the requirements of respective provinces. He should be a competent business man possessing the knowledge of local conditions and resources.

The Board of Industry should be constituted with representatives of provincial commerce and industry and the Director of Industries at its head; so long as it remains an Advisory Board, it would be advantageous not to make the Board too small.

The deliberations of the Board should be presided over by the Director of Industries through whom all the recommendations of the Board should go up to Government.

The functions of such a Board should be to investigate the possibilities of industrial enterprises, to secure and give expert advice for the promotion of industries, to advise Government in what way and shape financial aid should be given to industries and advise Government whether pioneer factories should be established, to show whether any new industry is commercially profitable.

The Director of Industries should be engaged in watching and guiding the existing industries of the province with a view to develop them and in making enquiries and directing researches to help the existing industries and to develop new ones. His function should also be to examine and report in each case of applications for Government aid.

There should always be interchange of ideas and of information amongst the Directors of Industries and periodical conferences should be held of the representatives of the several Advisory Boards and the Directors of Industries under the presidency of the Minister of Commerce and Industry.

For the present there does not seem any great necessity for establishing an Imperial Department of Industry. Imperial administrative control as far as necessary should continue to be exercised by the Minister of Commerce and Industry.

Reference
libraries.

Qs. 78 and 79.—Books of reference are hardly available to the public. It will be of great help to industrial enterprises if reference libraries are established on a suitable scale in large centres of industry and commerce. They may be more appropriately associated with commercial museums wherever they may be established.

Colleges of
commerce.

Q. 80.—Owing to want of provision for commercial training the commercial firms experience great difficulty in getting assistance who can render them real help in the management of their affairs. For want of men properly trained in commerce and competent to manage industrial enterprises there was recently deplorable failure of some enterprises in this province. It is very desirable to have a large number of men properly trained in commerce to conduct and manage commercial and industrial enterprises. A commercial college is therefore a vital necessity in this province. It should be established on the lines of the commercial college established in Bombay.

Q. 81.—Industrial development will follow commercial training. Proper commercial training combined with practical work will make one a man of business and it is only a thorough man of business not merely an expert with theoretical knowledge who can successfully conduct or manage an industrial business.

Q. 96.—In the interests of honest trade and commerce and for the protection of men actually engaged in trade and commerce, and to prevent fraud, it is extremely desirable that the names of partners of all firms engaged in trade and commerce should be disclosed to the public or should be capable of being ascertained by outsiders; otherwise non-registration of the names of partners gives opportunity to dishonest traders to evade liability. I know from personal experience that in several cases firms consisting of solvent and insolvent partners having failed in business, the solvent partners tried to evade liabilities by disowning all connection with those firms. Such a plea is invariably set up by partners living far away from the actual scene of business and in such cases it is very difficult to prove their connection with the firms. Instances have been known in which people, with a view from the very beginning to defraud the public, set up businesses in the names of their respective wives or minor sons, and when those businesses failed they invariably set up the plea of having no connection with the firms. There is a good deal of uncertainty as to who are partners of different firms and this hampers trade.

ORAL EVIDENCE, 7TH DECEMBER 1916.

President.—Q. In connection with question 43 you say that “the Land Acquisition Act, having been amended authorising Government to acquire land on behalf of public companies, I do not think it necessary to make further changes in the law.” Is that quite correct? I understand that the Land Acquisition Act authorises a local Government to declare what is acquisition for a public purpose, but what you call a public company would not come under public purpose?—A. For sidings for jute mills I have known Government acquiring land under the Act.

Q. This is essential for the railway as a public carrier?—A. What I mean is that is for the convenience of the jute mills that land is acquired.

Q. You do not give the railway access to the jute mills. It is really an extension of the railway in order to make it more efficient as a public carrier. If a jute mill wanted to acquire land it could never get the sanction of Government. What we wanted to know was that in view of the fact that Government would not use the Land Acquisition Act and probably under the wording of the Act would not be justified in using that Act in order, for example that a jute mill might extend its godowns or even labourers' houses, do you think it is necessary that additional power should be granted to Government in order to acquire lands for the use of an industrial company which would be working for private and only indirectly for the public good?—A. That must be left to private arrangement. Otherwise the land owners will make a grievance of it.

Q. You are against Government using this power?—A. Certainly.

Q. You say in answer to question 81 that industrial development will follow commercial training. We have had a certain number of witnesses who seem to be under the impression that you must have your industries first before you can adopt anything like a system of training, because if you merely train the boys and turn them out of the school you will do them more harm than good. What is your opinion on that point? Do you think that in the beginning of industrial development it is better to allow your commercial colleges and your technical schools to follow the industrial development or to go ahead of the industrial development?—A. To go ahead.

Q. Then what will you do with the boys when they are turned out of the school?—A. Most of the men who have received good training have been able to secure good employment whether under the British Government or in the Feudatory States or elsewhere. The really expert man does not find any difficulty in getting employment.

Q. We have been told that many of the students who have been trained in technology and who have obtained degrees have not been able to obtain employment on their return. The question of training is apparently not successful when there are no industries to absorb them?—A. Most of the indigenous enterprises recently started collapsed on account of the want of proper men to conduct the business, and therefore I say that the right type of men is absolutely necessary.

Q. The whole question comes back to what is proper training. If for instance these *Swadeshi* enterprises, which failed in such great numbers, were able to find students trained in a commercial college or technical institution, do you think they would have been more successful than they were?—A. I believe so.

Q. The whole thing comes back to what is proper training and if we assume that many of the boys from the colleges had a fairly good college training, and if they were not able to obtain employment, is it then fair to assume that college training is not sufficient?—A. Theoretical training is of no use unless it is assisted by practical training in workshops.

Q. Is it not a better plan to begin your industries and to get your boys trained in the workshops and then provide technical training facilities for them?—A. This is a matter in which there are different opinions and it is very difficult to formulate any particular plan.

Q. We have a certain number of industries. Should we not proceed and develop from them boys who will go into these industrial workshops and then provide facilities for their obtaining higher technological training. That will be a training following, but not very much behind, industrial development?—A. In a manner simultaneously. In my opinion we must give commercial training first, some sort of training before the industry is developed. You must admit that there is a cry everywhere for commercial colleges and for technological colleges. People are no longer satisfied with literary pursuits.

Q. We do not listen to cries of that kind unless they are justified. It seems to me that there has been a tendency in many countries to suit your education to what the student wants instead of giving the student what you know he ought to have. The question now is which to have first—the commercial training or the industrial development?—A. Whether industrial development follows or precedes commercial training, I think the training received in technical colleges must be combined with practical experience in the workshops. Otherwise he cannot properly conduct an industry.

Q. This training must be accompanied by practical training and then we might have the industries established?—A. There are a number of established industries in this country and they can very well provide practical training.

Hon'ble Pandit M. M. Malaviya.—Q. You say that the proper commercial training combined with practical work will make one a man of business. Do you mean to say that if there is a man with a commercial training he will be able to examine the possibilities of a particular business and if he finds that business is likely to be able to pay he can then engage the necessary expert advice so far as the technical part is concerned?—A. Mere theoretical knowledge will not be of any use. He must have practical experience in the workshops. He will then be able to advise what sort of work should be carried on and whether there is any possibility for any particular industry.

Q. With reference to commercial training do you mean to say that so far as commerce is concerned you require a college of commerce in order that young men should receive proper commercial education so that they should be able to take more and more of the import and export trade in their own hands?—A. Exactly so.

Q. If you have a college of commerce, which will impart a sound business knowledge of banking, do you think that after a few years of experience these men will be able to manage banks satisfactorily?—A. Provided they begin from the lowest rung of the ladder and acquire the necessary experience.

Q. In addition to this you want industrial and technical education provided in order that the technical side of a business should be understood?—A. Exactly.

Q. You say that several banks would not give financial assistance to Indian managed companies however much the security advanced may be. Which banks do you refer to?—A. I do not remember of any particular bank and even if I knew I would not like to say. That is the general impression.

Q. You say that it is a painful fact that indigenous enterprises do not receive financial assistance from banks. Does the Presidency Bank also come under this category?—A. I do not like to say.

Q. With reference to the proposed industrial bank, do you think that the Government should assist it in any way?—A. Government should patronise it by subscribing a portion of the capital, whatever that portion may be.

Q. Or by guaranteeing interest for a certain number of years?—A. Yes. That is one of the best methods.

Q. If Government guaranteed interest for, say 10 years, do you think that private capital would come in?—A. I think that would be a great stimulus.

Q. You say that Government aided factories should be required to take in apprentices, etc. Do you think it will be necessary to undertake legislation for that purpose? If Government exerted their moral pressure firmly, would not the object be attained?—A. It would.

Q. And particularly in the case of railways under State management, there can be no difficulty?—A. There can be no difficulty.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. Are you associated with the Indian Industrial Association which sends boys to foreign countries?—A. I pay some subscription at the yearly meeting of the Association. My connection with it is very little.

Q. Do the boys who return obtain good employment?—A. I enquired about it and I think that most of them got employment either in British India or in the Native States.

Q. So you think there is a scope here for a technical or an industrial school?—A. Undoubtedly. There is great scope.

Q. With reference to banking do you think that any bank will give you money without being satisfied that you will make profits?—A. At least it is quite unsafe so far as private individuals are concerned.

Q. If an industrial bank is started will it be able to advance money to enterprises after taking expert advice?—A. That should be the function of the industrial bank.

Q. You speak about the labour conditions in Java. Do you know anything about the labour conditions there?—A. I do not know, I know that in the beginning Government purchased the machinery and the whole thing was placed in the hands of private individuals.

Q. As regards the Board of Industries do you wish to have it elected or nominated?—A. I think that would be a good idea.

Q. Do you think that the capitalist can invest the money safely on the security of land or on the produce of the country?—A. They do it.

Q. What rate of interest?—A. 6, 7 and 8 per cent.

Q. If any industry which is making 10 to 15 per cent. profits asks for more capital would it be attracted?—A. Yes.

President.—Q. With reference to the sugar industry in Java you say that the success is solely and wholly due to the fact that Government assisted in the enterprise. Where did you get the information?—A. I read in Ranade's book. That was in the beginning. Whether it is so now or not I cannot say. I do not know about the present conditions.

Q. There must be some other cause besides Government assistance. We do not find that Government are doing anything at present?—A. Now the industry is in the hands of big capitalists.

Q. It would not therefore be correct to say that the success was solely and wholly due to the fact that Government started pioneer factories?—A. That is what they did in the beginning.

Q. Do you mean that without that initial support the enterprise would not have succeeded?—A. Yes.

Q. There must have been other causes also at work?—A. That may be so. I have no present information on the subject.

Sir D. J. Tata.—Q. You say that it is a painful fact that industries under indigenous management do not receive the necessary banking facilities. Would you be in a position to state any particular industry which applied for help and which was refused?—A. I can give you the example of the Bengal Laxmi Cotton Mills.

Q. Is there any inherent reason in the industry which made the bank to refuse, or was the refusal simply due to the fact that the bank did not want to support any indigenous industry?—A. I cannot formulate an opinion.

Q. Did they refuse it because it was an Indian industry?—A. They did not say it in so many words.

Q. They must have had some reason for the refusal?—A. I do not know what their real reason was.

Q. What do the other firms which have been able to get the money offer, which the mills were not able to offer?—A. I do not know.

Q. This statement "that the existing banks refuse to give facilities to industries under indigenous management," is made by a number of people, and I want to know whether there is any real foundation for it?—A. It is not absolutely devoid of foundation.

Q. You admit there might be good reasons for refusal?—A. There may be. But it is a fact that when indigenous enterprises asked for help they have invariably refused.

Q. You say that it is a painful fact. Is it merely a matter of belief; or is there anything substantial about it?—A. I cannot say. It is the general impression.

President.—Q. The banks are established for business. They have no national prejudice. If the bank advanced money on the machinery, it could not readily recover the money and it is dangerous to saddle the bank with a lot of machinery which may be unsaleable when there is a run on the bank. The banks would do business with anybody, irrespective of whether the concerns were Indian or otherwise if there was safety for the money. In a country like this there must be more Indian concerns than English concerns and the banks would find it profitable to advance money if they could safely do so. The English firms have established a reputation and so there is confidence in them, whereas the same cannot be said of many new Indian concerns. Don't you think that the prejudice may have had its origin in that way and that a wrong inference may have been drawn. We have three distinguished members of the Indian commercial community in the Commission and they would not say that they find it difficult to get money if they wanted to get it. May I understand you to mean that in a similar set of circumstances, the same security being offered by an European firm, they would have been able to get the money whereas an Indian firm would not?—A. It is not possible to answer that question.

Q. If you are not inclined to answer the question I do not want to press the point?—A. It would be impossible to answer the question.

Q. Is it fair then to retain this sentence in your statement if you cannot answer the question?—A. I think it should remain. It is the general experience of this part of Bengal.

Q. There are more cases of Indians being refused than English firms being refused. Is it correct to say that the bank only refuses because it is an Indian concern apart from the merits of the case?—A. I cannot say. But everyone knows in Bengal that financial assistance is invariably refused to indigenous concerns.

Q. Would you as a financier be prepared to advance money to the Bengal Laxmi Cotton Mills?—A. I would not hesitate.

Sir D. J. Tata.—Q. If it is a fact that banks refuse the giving of money because they are Indian concerns and for no other reason, then that is a matter which the Commission ought to take notice of. With reference to industrial development and commercial training I believe your idea is this. If our young men went and qualified themselves and got theoretical knowledge, that alone would not be sufficient, and they would not be qualified to take charge of any actual business; but if they did some practical work with some industrial concern they would be able to manage the concern at no distant date?—A. My idea is that he must have some practical experience first.

Q. When you say that practical education must precede industry that means that before anybody is qualified to conduct an industry he must get a theoretical knowledge combined with a practical knowledge; is that what you mean?—A. Yes.

Q. Don't you think that the ideal condition will be to make it more or less a family affair. For instance take the sugar business. If the young people belonging to the family that has been engaged in the sugar business were sent out for training and if they applied themselves after their return to the family business beginning from the bottom and going through all the processes, don't you think that would be the ideal condition?—A. That is the ideal condition. But it is not the sons of business men alone that may be sent out but others may also be sent out and they may be made to receive practical as well as theoretical training.

Q. We can advance our industries only if those who are connected with industries train up their children so as to be able to carry them on on a systematic and scientific scale?—A. That would be preferable.

WITNESS No. 120.

Mr. A. C.
Banerjee.

MR. A. C. BANERJEE, *Honorary Secretary, Indian Mining Federation, representing the Bengal National Chamber of Commerce, Calcutta.*

WRITTEN EVIDENCE.

Capital,

In conducting some collieries and in floating joint-stock companies I have personal experience of raising capital. As Honorary Secretary to the Indian Mining Federation I frequently come in contact with others engaged in and attempting industrial enterprises. Our difficulties in raising capital are very great. The capital which has accumulated to some extent in the hands of a few families is being mainly employed in financing the people engaged principally in trades like rice, jute, etc., which require a very large amount of money and also in advancing loans on landed properties which offer good securities. Industrial enterprises are getting support from the middle classes. But their resources are limited and it is often the case that the nominal capital and the paid-up capital of a concern differ very largely and that a call for the unpaid amount is hardly responded to, coupled with this the difficulty in getting loans makes the situation most uncongenial for industrial enterprise.

As for the mining industry the banks generally do not give loans on the security of our colliery properties however substantial they may be. With the private capitalists our properties have little value. The small collieries are sometimes put to such straits that they have to borrow at a rate of interest varying from 36 to 84 per cent. annually. The case of joint-stock companies, if not as bad, is not much better.

Those who subscribe to joint-stock companies, expect a dividend immediately and as they cannot get it generally in a year or two no substantial portion of the unpaid capital can then be raised. The result is that the concerns suffer heavily for want of funds and some of them collapse. If the Government would guarantee dividends for a limited period in favour of suitable industries, some amount of capital which now remains blocked or is invested for unproductive purposes will most likely be available for industrial purposes.

Government
assistance.

It is a matter for great satisfaction that Government is now taking an active interest for the development of industries in India. To attain that end Government will have to make sustained efforts and to take action in different directions. Of the lines of action indicated I fully approve the following and earnestly appeal to Government to take measures in those directions :—

- (1) To make adequate provision for technical training by establishing technological colleges and industrial schools, so that there may be a sufficient supply of skilled operatives and expert factory managers and supervisors successfully to conduct industrial enterprises.
- (2) To establish commercial colleges in suitable centres with provision for a term of apprenticeship for the students in suitable business firms, so that competent men may be easily available for properly managing or assisting the management of commercial and industrial firms.
- (3) To make research arrangements in a thorough and comprehensive scale and to make such organisation readily and easily available to industrial enterprises and to the public.

- (4) To make arrangements for establishment of properly organised commercial museums in commercial and industrial centres. The development of different articles from the state of raw materials to finished products should be shown in the museums and wherever deemed profitable the process of development of similar foreign articles should be shown for guidance.
- (5) To guarantee dividends for a limited period with the object of drawing in capital for industrial purposes. It is reasonable and desirable to make provision for refund of the expenditure incurred in paying dividends at the guaranteed rate, when a concern has begun to show a large profit.
- (6) To grant loans to industrial enterprises generally with interest at a moderate rate and on easy terms.
- (7) To help suitable industries with bounties and subsidies.
- (8) To help industries with their credit to obtain machineries on the hire-purchase system.
- (9) To help an industry by guaranteeing purchase of products for a period sufficiently long to help it to grow self-supporting without such aid.
- (10) To afford adequate transport facilities by railways and waterways.
- (11) To regulate the rate of freight of railways in a way as would be favourable for the industrial development of the country.
- (12) To establish industrial banks all over the country in suitable commercial centres, each provincial group having a central bank in the provincial town. The object of these banks should be to grant loans to and stand guarantee for industrial enterprises on proper security of their stock-in-trade and other properties and also to help the marketing of their products and to grant loans, with discretion, to industrial co-operative societies.

For the proper conduct of the commercial and industrial branch of the administration I am of opinion that it is desirable and necessary to appoint in every province a Board of Industries consisting of representatives of industries and commerce of the province with a competent business man at its head as Director of Industries. The Boards should at first be advisory. It may be later on desirable to make them executive bodies with funds at their disposal. Their present duty should be to help the development of existing industries and the growth of new ones and to advise Government regarding measures that should be undertaken for the purpose. Provincial commercial organisation.

The Director of Industries should be in constant touch with the people conducting industrial enterprises and render all possible assistance in removing their difficulties and helping them to develop the industries, examine all applications for Government aid to industrial enterprises. In short he and the Board should actively co-operate for the development of industries in the province and determine for Government the lines of action it should take for the purpose.

There is hardly any necessity, at least for the present, for establishing any elaborate Imperial Department of Industries. The object of correlation of the industrial works in different provinces may be attained by interchange of ideas and informations amongst the different provincial organisations and by holding periodical conferences. The Minister of Commerce and Industry will, as a matter of course, exercise necessary administrative control.

Co-operative societies, if properly organised and guided, will, I believe, very materially improve the condition of the masses. At present the condition of the lower classes of people are far from what it ought to be. Though they generally live an honest life and are regular in habits, their credit, on account of their poverty, is very low. They have often to borrow money and that at an exorbitant rate of interest, which places them entirely in the hands of the village money-lenders. Cottage industries cannot be developed to any large extent unless the people can get financial help, in the shape of loans, at a moderate rate of interest. This can only be done by organising co-operative industrial societies. The object of those societies should be to render financial help to their members for productive purposes and use their credit in the interest of their members, to obtain necessities of the industries in which their members are engaged, and also to organise the sale of the manufactures of the members. Co-operative societies.

These societies should be helped with loans by the industrial banks proposed above.

So far as the agriculture and mineral resources are concerned, it is absolutely necessary that surveys should be organised on a comprehensive scale. Though the country is generally and largely agricultural, it is curious that even the properties of the soil of different tracts are not known. For want of a thorough geological survey and proper guidance as to the mineral resources of the country haphazard adventures are being made. The gold and black-lead mining enterprises in Hazaribagh may be cited as illustrations. Industrial surveys.

The survey work and the research work which have been done here and their result generally remain unknown to the people. It is absolutely necessary that Indians should be largely associated in these survey and research works and their reports and results should be

popularised by supplying them free to all commercial and industrial associations and making them available to the public at a nominal price.

It will also be of very great help to industries if a Gazetteer be published giving under proper heads references of all surveys done, all researches made whether here or abroad on Indian subjects and all monographs and bulletins published.

Training of labour
and supervision.

I have observed most satisfactory results following training of apprentices in factories and workshops. Under the present arrangement the apprentices have to pick up their information and to get what they can by humouring the managers and the foremen. If the system of apprenticeship be well organised with provision for Government supervision and guidance great results will follow. It is also necessary that provision should be made safeguarding the interest of factories taking apprentices.

No great industrial development is possible here unless properly organised technological institutes be established in suitable number and in suitable places for the proper training of young men for the post of foremen and supervisors of industrial enterprises. What we most lack is skilled foremen. Industrial schools should be started in large numbers to give an industrial training to a portion of the youth of the country. Each local school should, while adopting its curriculum, have an eye to the requirements of the locality. An industrial section may be added to the existing high and middle English schools of the country.

Government should also help the deserving scholars of the technological institutes and also competent factory-managers, supervisors and the like of suitable industries with scholarships to study condition and methods of other countries.

Difficulties in the
way of development
of mining.
Railways.

We experience great difficulty in getting railway sidings. Though there is provision for 3 per cent. guarantee on the outlay against the colliery concerned, the railways will not give sidings unless they are convinced beyond doubt that they will make substantial profit by so doing. On account of this large coal-fields in the Ranigunj District, such as the neighbourhood of Pandeweshwar and Panchra stations on the Ondal-Sainthia line, East Indian Railway, remain untapped. This difficulty should be removed.

We have no waterways running from one end of the country to the other. The railways therefore are generally the means of internal transport. The coal-fields are mostly in Bengal and Bihar. So the coal freight, at the existing rate, to such distances, as Bombay and Punjab, becomes very considerable and operates against the industries of those places. It is necessary to make the fuel cheaper for those places and with that view the railway freight of coal should be regulated.

I am engaged in the mining industry. For its further development I would suggest:—

Measures for deve-
loping mining indus-
try.

(1) A comprehensive geological survey indicating as fully as possible the mineral resources of the country; (2) adequate transport facilities; (3) the establishment of industrial banks for reasons stated before; and (4) active help from Government.

Industries for
which India is suited.

India abounds in the raw materials of various industries and is a principal source of supply to several manufacturing countries abroad. Most of the industries which use them can be developed here. I am glad Government is making an earnest effort to develop the sugar industry. Besides that, I think the industries of steel works, hardwares, chemicals, alcohol, vegetable oils, leather manufacture, salt and matches admit of immediate and considerable development in this country.

ORAL EVIDENCE, 7TH DECEMBER 1916.

Mr. C. E. Low.—Q. You refer to the difficulty of getting loans on the security of collieries. Do you refer to large colliery companies or do you refer to the small colliery owner who does not work regularly?—A. I refer to both.

Q. Do you consider that a European company of the same size and in the same position would be able to obtain a loan?—A. I believe so.

Q. You are not prepared to back up your statement by quoting actual instances?—A. Such cases are numerous, but I do not think I would be wise in declaring them publicly.

Q. You suggest that the different stages in the manufacture of the article might be shown in the commercial museum. That postulates a different idea of commercial museums altogether. The present museums are not so much for instruction as for providing a means of advertisement. Don't you think that what you propose could be more profitably done in a technological institution where it might assist industrial students as well as the industrial public?—A. It would be so.

Q. With reference to what you say about the industrial surveys and what the Geological Survey ought to do, don't you think that you are asking the department to go beyond its present constituted functions?—A. The records of the Geological Survey that we have at present do not exactly shew where particular minerals are available so as to make it commercially successful to take it up.

Q. You say that you have observed satisfactory results following training of apprentices in factories and workshops? Have you any cases in mind?—A. While I was at Delhi I had a relative of mine placed in a weaving mill; he was admitted as an apprentice and afterwards

when I came away he was sent to Jalgaon and he has picked up weaving now and he is getting Rs. 200 in a mill there. He has passed the matriculation only.

Q. You say that if the system of apprenticeship be well organised with provision for Government supervision great results will follow? Do you contemplate Government providing for its organisation? Have you any definite ideas as how that should be done. The point has been raised by other witnesses and we regard it as one of importance?—*A.* What I mean is that the boy is at present left to the sweet will of the manager and he has to depend on the good humour of the manager. If for example there is a Government Inspector who goes round the different mills, the mill manager will understand that he has a duty towards these apprentices and give them proper training. The Inspector will make a report to the educational or whatever department it may be.

Q. Don't you think that anything of the kind will make the mill managers reluctant to take apprentices instead of taking them in larger numbers. What should the Government do to add to the inducement of the managers?—*A.* Matters can be much improved if the Government and the people work harmoniously. We in the collieries do not object to take apprentices. We do not object to examination by the Inspector.

Q. Have you any suggestions as to how that should be done. Would you make it compulsory for all factories to take apprentices or would you only offer inducements?—*A.* If the mill managers would not take them and the apprentices are left to the sweet will of the managers I would make it compulsory because I want the men to be trained.

Q. In England they have to pay a premium?—*A.* That is a good idea. We could have it here as well.

Q. Do you think people will pay?—*A.* In our factory we give them Board and lodging. In the case of some we had to refuse because we could not. They agreed to make their own arrangements. In the same way if they were asked a premium I think they will be willing to pay. We might have a regular agreement for a certain number of years. The idea is to have a systematic training at the factories and mills.

Q. Could you get anybody to pay?—*A.* I think even if an agreement were demanded they would be willing to come.

Q. Have you any further suggestions to offer as to what inducement Government might provide to the mills to take apprentices?—*A.* Stipends might be given to pupils showing the best results.

Q. How will that appeal to the mill? Is there any way by which Government can bring inducement to bear on the mill rather than compulsion?—*A.* I have never thought of the subject. If necessary that can be worked out between the mill owners and the Government.

President.—Q. The Geological Survey can indicate the mineral resources of a particular district in general terms, but they cannot show you how much gold there is in any particular place? Have you read the reports of the gold prospecting in the Chota Nagpur published by the Geological Survey?—*A.* No. This I have written with special reference to graphite, because one of my friends purchased some villages in the Hazaribagh district. He could not know in what particular place graphite could be found and after spending nearly 15 to 20 thousand rupees and making trial pits, he succeeded in locating the place and now he is making it a profitable concern. Why I am saying this is, is it not possible to have a record of the exact mineral resources of the country so that one can easily find out whether they could be taken up with success as a commercial proposition.

Hon'ble Pandit M. M. Malaviya.—Q. With reference to industrial banks do you think that if the Government guaranteed interest on shares held in the bank, people will be willing to come forward to invest money in it?—*A.* Yes.

That would inspire sufficient confidence Government guarantee always inspires confidence. If Government guarantees interest, say, for a period of ten years, and if during that time the bank has acquired sufficient stability, then the people will come to invest money.

Q. About the failures of the banks that you have referred to, do you think that they would not have failed if they had received some assistance from some bigger banks or from Government?—*A.* If they had received help from the bigger banks they would not have failed.

Q. You are aware that in England and Germany and America, when there has been a banking crisis, the bigger banks have assisted the smaller banks and the State treasury has also assisted them particularly in America, to tide over the difficulty?—*A.* Yes.

Q. If you had an industrial bank with Government guarantee, there would be no doubt about their stability?—*A.* Yes.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. Do you mean to say that Government should compel private mills to take apprentices?—*A.* I do not exactly mean that there should be compulsion. But there should be some regular system and understanding for taking apprentices.

Q. Supposing they do not want to take them? How can the Government compel the people of the country. If they are not willing to take how can the Government compel? If there were technical institutes do you not think they would have better opportunities?—*A.* No. I do not think so.

Q. The mills generally do not take men because they have a lot of business secrets and they do not want an outsider to get to know them and then go and make them public. You

must have some trust and control over the man. A contract is no good. If I do not want to work I can misbehave myself and take the opportunity of going away. Have the collieries many business secrets?—A. The collieries have got their own secrets as well as the mills. Every trade has its own business secrets which cannot be divulged.

Q. You won't take a man whom you do not trust?—A. I would not take him.

Q. You don't want the Government to force the man on the mills?—A. What I mean is there should be some understanding.

WITNESS No. 121.

Mr. G. S.
Henderson.

Mr. G. S. Henderson, Imperial Agriculturist, Pusa.

WRITTEN EVIDENCE.

My experience is confined to Sind and the following statement is based on nine years' residence as Deputy Director of Agriculture in that province.

Sind is a large country with a small population and only a small proportion of the available land is cultivated and the cultivated land itself is only cropped once in 3 or 4 years with the exception of the rice area. Consequently there are few industrial enterprises and even agriculture suffers from want of labour. The country is the hottest in India and is unhealthy. Only two classes of emigrants will come into the country—Punjabees and Marwaries. The latter include Tharies and Cutchies, inhabitants of the huge deserts which surround Sind. Only the pressure of famine forces them into Sind where they can earn good wages and if any rain falls in the desert they return home in large bodies at a day's notice. Rs. 15 per month is often paid for a coolie who would be considered dear in Bihar at Rs. 4.

Practically the only industrial enterprises are concerned with preparing agricultural products for marketing, *i.e.*, rice husking and cotton ginning and pressing. Rice and cotton are the chief export products of Sind. Karachi has a large export trade in wheat and oilseed but these come from the Punjab and United Provinces, this applies to a large extent also to hides and bones.

Rice.—There are rice hulling and boiling plants at every railway station in Sind which is near a rice district. The plant is generally good but badly kept and often driven by portable engines. There is plenty of capital available for the erection of such machinery. They belong to 'bantias' who frequently lend money on the growing crop of rice. There is no lack of rice hullers, in some towns the work is pooled, but this is not common. Rice is usually exported up the Persian Gulf, to Aden, and to the African coast as far south as Zanzibar, mostly in country craft.

Wheat milling.—One large up-to-date flour mill was lately erected at Shikarpore in Upper Sind by a Punjabee banking syndicate. It was only working half shift owing to failure of a number of Indian banks. Two smaller mills are in Larkana, they are well run and belong to bantias. The wheat for most of these mills comes from the Punjab. There are also a number of mills in Karachi some of which are run by European capital.

Cotton ginning and pressing.—Cotton growing has increased very rapidly in Sind of late years. It started in Hyderabad and is most largely grown there, and in Nawabshah and Thar and Parkar districts, it will eventually be cultivated in Upper Sind as the cultivation is gradually creeping up both sides of the Indus. It is largely an irrigation matter, when the water supply is suitable it can be grown on any canal in Sind. The Sindhi prefers rice cultivation when he can get sufficient water but even so, cotton has put rice out in large areas of the Eastern Nara canal. Cotton is the great ready money crop. If the production is put at 200,000 bales value Rs. 100 each, it will be seen what the crop represents to a poor country. There are various schemes for substituting perennial canals for existing inundation canals and building a barrage across the Indus at Sukker to ensure a constant supply of irrigation water in the cold weather. By the improvement of existing irrigation systems cotton cultivation will be increased and the general industrial and agricultural state of the country put on a higher level. Irrigation improvement outweighs every thing else, and is the most promising field of Government activity.

Cotton trade.—Cotton growers sell outright to the gin owners. The chief seats of the ginning industry are at Mirpurkhas, Hyderabad, Tando Adam and Shahdadpur. There are hydraulic presses also at these places. A number of the gins belong to the 'bantias' who frequently lend money on the growing crop. The 'bania' owners sell eventually to the export firms like Ralli and Vilkhart. There is plenty of capital available for the erection of gins and new ones are constantly being erected, in especial, at stations of the new light railways through the cotton areas. Messrs. Ralli have a gin and press with a capacity of 40,000 bales at Mirpurkhas. This firm fixes the price of cotton daily and the factory managers are not allowed to pay more or less than the fixed price for cotton brought to the factory, with allowance of course for dust and discoloration.

It is currently believed that the policy of this firm is to avoid speculation in cotton and whatever is bought in Sind is sold simultaneously in Liverpool. They have agents in the cotton villages and their crop estimates are numerous and reliable. Platt's doubleknife gins are invariably used and the cotton seed is all exported.

Hydraulic presses being very expensive are not so widespread as the gins, but there are more than sufficient for the work. The presses were in a pool sometime ago and a number were idle but the pool broke down.

New crops.—It is now well established that before any new export crop can be given out for general cultivation in a district, some arrangement must be made for the sale and disposal. Good varieties of American cotton were found to grow well, the yields were satisfactory and there were no inherent difficulties in the cultivation. Samples were graded as "Middling" American but it was found that the local trade would only give a small premium over Sindhi cotton and in some cases refused to touch small quantities. The Bombay Mill-owners' Association took the matter up and sites being supplied by Government erected two small gins, one at Mirpurkhas and the other at Shikarpore, and agreed to buy Sind-American cotton, according to the current quotation of American cotton in Liverpool. After two years' working it was found that a reorganisation was necessary as the following details were found to be unsatisfactory:

I. Agents sent up had no experience of Sind and did not know the language or customs, consequently considerable friction arose with the growers.

II. Roller gins were installed against the advice of the Agricultural Department instead of American saw gins.

III. Gin in Upper Sind was a failure, it could not get sufficient cotton owing to two bad seasons with late irrigation water in the canals.

IV. Local firms bought American cotton in opposition to the syndicate and the supply was limited. In one year some 500 bales were bought and ginned by the syndicate (of excellent quality) but great difficulty was found in keeping the seed unmixed with local Sindhi cotton seed. Even when good pure American seed is sown, roots in the soil of a former Sindhi cotton crop spring up and cause admixture. The factory is still running and it remains to be seen if it is going to put the growing of American cotton in Sind on a commercial basis.

Export crops.—Government intervention in the case of export crops is considered necessary in many countries and has done much to raise the standard and uniformity of export production, *i.e.*, wheat in Canada and fruit and dairy produce in Australia. Indian white wheat is exported under an allowance of 2—2½ per cent. dust (and 40 per cent. red wheat). It also contains barley and oilseeds as an impurity. Finally, it is all shipped in bags which are ripped open on arrival at a European port. This state of affairs would be obviated by the erection of wheat elevators and establishing legal Government grades. At present there is no object in producing clean wheat in India as the buyer would add the trade allowance of dirt before shipping. Small parcels of clean wheat would probably not be looked at by the trade at home.

Seed farms.—Grants of Government land on easy terms to properly experienced and properly financed individuals or syndicates for seed farms, as has been done in the Punjab, would be of advantage. Non-export crops need no special Government intervention. In the normal course of work, by itinerant instructors, agricultural shows and demonstration plots, the various provincial Agricultural Departments bring recent improvements to the notice of the cultivators.

Agricultural schools.—A beginning was made in Sind for the training of young land owners by starting a vernacular agricultural school at the Mirpurkhas Government farm. Ten boys about 17—20 years old had an annual course, the mornings were spent in practical work on the farm with lectures in the afternoons. The work was in Sindhi and the main object of the work was to show practically what improved methods, implements and crops were suitable for adoption in ordinary Sind agriculture.

Railway construction.—The country is well served with main lines and 3 light railways have been built and are in operation. They are about 40 miles long and link up important agricultural areas with the main lines. No less than 7 new lines are under projection as private enterprises and the capital is always over-subscribed. The first light lines are paying 12 per cent. interest.

Research abroad—is of the utmost value and the Government experts should be encouraged to travel in tropical and other countries. This prevents the work and activities of any department getting hidebound and introduces new ideas of great value. Personally I have found a previous residence in Egypt of great benefit as also a tour in the cotton states of the United States of America.

The Imperial Institute of London is of value as the authorities are in touch with the various trades and they are always willing to send valuable valuations and reports on new economic products.

General conditions.—On the whole the Sindhi cultivator is not badly off. He makes a living without particularly hard work. The fear of famine is never before him, at the worst only a shortage of canal water. A cultivator and his family are said to need 5 cows to keep them in milk, so they are better fed than in most parts of India. There is plenty of capital in the country and if Government money is available for irrigation work in sufficient quantity, local industries have no need of any special adventitious aid.

ORAL EVIDENCE, 8TH DECEMBER 1916.

President.—Q. You were Deputy Director of Agriculture in Sind?—A. Yes.

Q. Have you now been transferred to Pusa?—A. Only temporarily for a year.

Q. What are you doing specifically at Pusa?—A. Managing the Pusa farm.

Q. How long have you been at Pusa?—A. Five months.

Q. Have you looked into the question which has been raised by Mr. Howard about aeration of the soil and the system which he has adopted for entrapping new silt and building up on the previously existing soil?—A. No. I have not gone into it fully. I have read his views on the subject.

Q. Are you a soil expert?—A. To a certain extent.

Q. It is more properly your function than, for instance, that of the Economic Botanist?—A. I think it would be.

Q. Have you not followed this research for him?—A. No. I cannot say I have.

Q. I do not understand what system of Government there is at Pusa that allows a botanist to carry on research in soil whilst you as agriculturist take only a passing interest in the matter?—A. So far as I am aware Mr. Howard has not worked his theory out on a practical basis, and when he does we will try it on a practical scale on the farm.

Q. If it is a theory worth considering and worth testing, surely it is a problem that ought to be handed over to an appropriate specialist and not to be followed up by an economic botanist?—A. He would probably work it out more fully and hand it over later on.

Q. Have you got any means of having a matter of this kind discussed in a Council so that you can decide as to who is the appropriate specialist to undertake such researches?—A. We have got a Council at Pusa.

Q. Has this question been before the Council?—A. No.

Q. If there is anything in the idea at all, if he has got as he says definite results, it seems to me it would be better for a soil specialist to take over the work from him and go on with it. He has not consulted you?—A. He has not done so far.

Mr. C. E. Low.—Q. When a problem of that sort taken up by a member of the staff rather outside his own line reaches a stage at which it has been demonstrated outside the college on lands belonging to other persons, don't you think that before that happens it ought to be considered in Council and handed over to the member of the staff more particularly responsible for that kind of work?—A. Yes. Certainly I think it would be better.

Hon'ble Pandit M. M. Malaviya.—Q. Is there not some advantage in allowing the gentleman who has taken interest in the particular question at Pusa and who has thought of it to work it out in his own way and then present the results to the Council?—A. I think his idea will probably be to work it out till he gets it on a fairly big scale, and then to hand it over.

Q. Possibly in the earlier stages it may not commend itself to the particular gentleman to whose department it is to go?—A. The agricultural section would take it at once as soon as it is requested to do so. Until he has had it on a fairly big scale probably he does not want to test it on the farm.

President.—Q. It has already been applied to land outside the Pusa farm?—A. Only on a very limited scale, I think.

Q. I do not understand why it is applied outside in any way by an officer or at the instance of an officer who is not necessarily a soil specialist. As Economic Botanist he ought to be a better botanist than a soil specialist. He is spending time over work of that kind which a soil specialist will do more quickly and thoroughly?—A. No proposal has been so far put to my section. If Mr. Howard wants it to be introduced into the farm he will bring it to the Council and then a scheme will be made and it will be tried on the farm.

Q. It would be his business to bring the matter to the notice of the Council?—A. Yes.

Q. And no other officer's business to interfere with it?—A. If the director liked to take it up he might put it before the Council, but no one but the director or Mr. Howard could bring it up.

Mr. C. E. Low.—Q. What was your agricultural training before you left England?—A. In England I was in the Glasgow University and in the Glasgow Agricultural College.

Q. Had you any practical experience in farming in the United Kingdom?—A. Yes. I have been on farms practically all my life.

Q. How long were you in Egypt?—A. About three years.

Q. And you find your Egyptian experience of value here?—A. It was of the greatest value in Sind.

Q. It enabled you, of course, to introduce *Trifolium Alexandrinum* in this country?—A. Yes.

Q. You find it a good fodder crop in Sind?—A. It is of very great advantage especially when introduced with Egyptian cotton growing.

Q. You consider free yielding green fodder crops suitable and important with reference to the local needs?—A. It is of the greatest importance.

Q. Turning to the question of cotton, what cotton are you growing in Sind?—A. American Mississippi valley cotton.

Q. Is it medium?—A. It is a long stapled Mississippi valley cotton.

Q. Does the cultivator who grows that crop get a greater profit under the existing conditions than from other crops?—A. It depends a lot on the price, because the ratio between desi cotton and American cotton varies immensely.

Q. Are you able to secure a price which enables him to grow this at a tempting profit?—A. For the last few years we have got very good prices indeed.

Q. You consider that the amount of cotton now produced in Sind is such as to give a reasonably free market?—A. It will probably be amalgamated with the Punjab American cotton. With the combined crop there will be sufficient to put it on a commercial basis.

Q. How many bales did you turn out in Sind when you left?—A. About 700 or 800.

Q. Have you experienced any difficulty in getting cotton put on to the market in an unmixed condition?—A. Considerable difficulty.

Q. What means have you adopted to overcome that difficulty?—A. We have a touring staff who inspect all the cotton growing places and get cultivators to rogue it.

Q. You are aware that other people mix it afterwards?—A. Yes.

Q. You find it is mixed between the time it leaves the farm and the time it gets into the hand of the ultimate purchaser?—A. The great trouble with the mixture is supplying seed. The seed is mixed.

Q. Was there not subsequent mixing by dealers?—A. I do not think much.

Q. Is that not perhaps the case because the quantity is comparatively small, and is there not danger of that condition coming into being when you get a larger quantity?—A. The buyers are able to look after that. There is a very big difference between American and desi cotton.

Q. You are well aware that the same thing occurred in Madras in respect of Cambodia cotton?—A. There is also deterioration as well as mixing.

Q. There was admixture by dealers?—A. I suppose there was.

Q. Did cultivators agree to have their fields rogued?—A. Some of them did. But in the case of annual tenants some difficulties arose. The zamindars had not full authority over their own land.

Q. You got the influence of the zamindars on your side?—A. The zamindars as a rule are quite keen about it, but they have to deal with their annual tenants.

Q. Sind is not a suitable field for co-operative organisation?—A. It is one of the worst fields in India.

Q. Do you think that when you get a larger area under American cotton the danger of admixture by dealers would be a serious one?—A. I think buyers will be able to take steps to prevent that.

Q. You think that big buyers would go into the field fairly early and would be able to control the situation in a few years?—A. Yes.

Q. Are buyers at present giving prices which make it worth the while of the cultivator to grow American cotton rather than the local?—A. Prices are phenomenally high.

Q. The price of Indian descriptions are considerably below what they used to be comparatively?—A. There is a very high ratio between the price of desi and Sind-Punjab American grown cotton.

Q. You remember the year 1912 when the price of Indian cotton was relatively very high compared to American?—A. Yes.

Q. Had you any difficulty that year?—A. That ratio did not keep the whole year. At the beginning the ratio was much wider and latterly it narrowed, but most of the American cotton was sold fairly early.

Q. As regards saw-gins how did you get people to take up saw-gins?—A. I started a saw-gin in one of the Government farms and we turned out very much better samples than with roller gins.

Q. You have difficulty in the distribution of your seed?—A. At the beginning there was a lot of difficulty on account of admixture.

Q. How did you manage to get out enough seed of the right kind unmixed to make it a big economic proposition?—A. We got the best sample selected on the field and bought the kapas from the men and superintended the ginning. There is a certain amount of mixture in the gin. Some seed of the cotton which has been ginned before remains in the gin and there is mixture.

Q. Do you find it necessary and advisable to start small gins worked by oil engines and owned by zamindars to secure pure seed supply?—A. In time to come it will be necessary to start at least one big central gin.

Q. You say the Punjab was growing a slightly different type of cotton. Are you keeping in touch with what they are doing in the Punjab?—A. I went up lately to the Punjab myself. When I was in the Bombay Department I had no connection with the Punjab.

Q. But the Directors and Deputy Directors of many provinces do correspond direct on subjects of common interest?—A. At that time they had hardly started in the Punjab.

Q. Do you think it would be more advantageous to grow the same type of cotton in Sind and the Punjab, for marketing and exchange of seed and the supply of each other's deficiencies in case of trouble?—A. I am afraid it would not do because the climate is quite different. A couple of months extra growing period in Sind is obtained, because it does not get cold so early.

Q. Do you think that more would be gained by a freer intercommunication of ideas between the different provinces?—A. I think it would. You have not got very much time for touring in other provinces. If you have got one province of the size of Sind it is big enough for one man.

Q. What is your staff?—A. When I started in 1907 there was no staff at all.

Q. Do you find your Sindhi eager to go to Poona and get educated?—A. No. They are not eager.

Q. What staff did you have when you left?—A. I had one Divisional Inspector and five central farms with a Superintendent in each and an itinerant staff of five graduates under the Divisional Inspector.

Q. You find that enough to push on cotton business in a satisfactory way?—A. You will have to go on extending it.

Q. Increasing your departmental staff?—A. Train men as quickly as possible.

Q. What staff would be necessary to grow 200,000 bales?—A. I should like to have a fully competent graduate in each talukha. If you are going to keep up to a certain grade it is absolutely essential to spend a lot of money and have a big staff.

Q. You do not think this applies to all crops?—A. Only to export crops.

Q. Is it not the case that in certain other parts of India they manage with a smaller staff working on co-operative lines?—A. I have no personal experience of it.

Q. You speak in your note of agricultural classes. What are the results of the school?—A. They have been hardly long enough in existence to give results. They are doing good work. The students are zamindars' sons.

Q. Do you teach them any general agricultural theories?—A. Very little theory but much of practice. There is practical work in the morning and then there is sufficient lecturing work to explain what they have seen in the morning.

Q. You teach them how to use the saw-gin?—A. Yes.

Q. How long has this been going on?—A. It was started in 1911.

Q. Some boys have gone out?—A. Nearly all have gone back to their lands.

Q. Have you kept in touch with them?—A. Some.

Q. And they are doing some good?—A. I think they have done good.

Q. You have had some experience of agricultural implements in Sind. Do you think there is a big future for cheap agricultural implements of the right type such as reaping machines?—A. I do not think that Sind is a place from which you can draw conclusions. We have reaping machines on the farms, but it is hardly a feasible proposition outside.

Q. What about things like ploughs?—A. Ploughs have done very well indeed. There is a good demand now and they are being made in the villages. We have introduced models of Egyptian ploughs. We brought out shares in quantities from England for these ploughs and sold them at one rupee to the local mistries.

Q. You say, "The Imperial Institute of London is of value as the authorities are in touch with the various trades." Supposing we had an Indian Trade Commissioner in England working in close touch with the Board of Trade don't you think that he would be a better man to put you in touch with the trades?—A. As long as he can give me the addresses and tell me about the various firms I want to know, he is quite good enough.

Q. Do the Imperial Institute give addresses?—A. Yes, for example I wanted to send early potatoes from Karachi to Covent Garden Sales and I asked the Imperial Institute to give the address of the people there.

Q. Have you any experience of fruit farming in Sind at all?—A. I have done a little.

Q. Do you think there is a big future for it in Sind?—A. Sind grapes are well known.

Q. Can they be improved?—A. They are very good indeed and they get very good prices.

Q. Do you think anything can be done to improve the packing and despatch of them?—A. I suppose there might be. I have not had any difficulty in sending them down to Poona and Bombay.

Q. Can they be produced on a large scale?—A. Yes. It is a matter of irrigation.

Hon'ble Pandit M. M. Malaviya.—Q. Is there a weaving mill in Sind?—A. They did start one at Hyderabad but it collapsed. This was about four years ago.

Q. Do you know the reason of its collapse?—A. I think it was financially unsound.

Q. It did not receive sufficient financial support?—A. The people who were going to buy went out at the last moment.

Q. Did it collapse in the initial stage before the machinery was bought?—A. They had got machinery erected, but they had not paid for it.

Q. Except this one there has never been any effort to start a weaving mill?—A. I do not know if there was any other.

Q. There is no mill for pressing cotton seed oil?—A. No. It pays better to export cotton seed out of India.

Q. Unless they made an effort to press the oil how could they say that it paid better?—A. They say that the existing trade circumstances are settled and they do not want to disturb them. It is easier to export cotton seeds than it is to export oil.

Q. You say, "It is now well established that before any new export crop can be given out for general cultivation in a district some arrangement must be made for the sale and disposal". Who gives it out?—A. It is recommended and seed given out to cultivators.

Q. Is it merely a recommendation?—A. Yes. No pressure at all.

Q. You say the "Non-export crops need no special Government intervention"?—A. I was taking the example of cotton and wheat. As regards wheat if we are going to grow a high class of hard wheat I think it is necessary to establish Government grades. We can grow much wheat in Sind. It will be a good crop eventually. It is a matter of irrigation. It is grown all over Sind, but it is mostly consumed in Sind.

Q. Is the wheat that you grow not yet exported?—A. It is mostly consumed unless the price reaches such a limit that it pays them to sell the wheat and use other grain.

Q. You say that "in the normal course of work by itinerant instructors, agricultural shows and demonstration plots the various provincial Agricultural departments bring recent improvement to the notice of the cultivators." How is the system of itinerant instructors working? How many have you, for instance, in Sind?—A. We have had five main farms in representative tracts and each farm has about three itinerant instructors. We aimed at 12 to 15 instructors.

Q. I take it that these farms are located at certain places. You have not the American system of demonstration farms being taken from village to village to instruct agriculturists?—A. Yes, for example, there is a farm at Larkhana, and the man goes to the various villages within reach of Larkhana.

Q. Is the whole province of Sind covered by this system of demonstration?—A. One or two districts have not been touched. The Karachi district has not been touched and part of Hyderabad.

Q. When was this system begun?—A. 1907.

Q. Has it led to any perceptible improvement in agriculture?—A. I think it has. It is a matter which will take many years to bear fruit. There is a good beginning made, I think.

Q. But so far as you are aware, have any figures been published up to this time to show what results have followed from this demonstration?—A. It is a very difficult matter to get any reliable figures for the first few years.

Q. I understand that you went to the United States of America at one time?—A. Yes.

Q. You are familiar with the system which obtains there on their demonstration farms?—A. Yes.

Q. In about 1903 they started the Knapps' system in the Southern States of North America?—A. Each State has its own way of doing work. There is no universal system. One State spends a lot of money and another State does not spend any money at all.

Q. They have extended it very largely so as to cover the whole of the Southern States of North America during the course of 9 or 10 years?—A. Some States have done practically nothing.

Q. I read in this book that the yield per acre has doubled from 1903 to 1912?—A. There are a lot of new lands being brought under cultivation which might account for a large part of the increase.

Q. So far as you are aware, the results in Sind have not approached anything like that?—A. No.

Q. You think there is room for expanding the system much more in Sind?—A. Yes.

Mr. C. E. Low.—Q. There is a scheme for increasing very greatly the irrigation in Sind?—A. Yes.

Q. Supposing the maximum amount of irrigation possible is secured, and supposing the values of the different crops continue as they are at present, what proportion of the area do you think will come under cotton cultivation?—A. There will be a very big proportion. It is very difficult to get the figures just now. The whole agricultural system of the country will have to be changed. At present it is worked by inundation canals and there is one crop and the lands lie fallow for about three years before another crop is taken up. With the new canals you will have a more intensive form of cultivation.

Q. You do not think that wheat, for instance, would oust cotton?—A. The Sindhi would much rather grow cotton than wheat, and the Punjabi wheat than cotton. Any sign of deterioration in the soil can be put down to bad cultivation, and not to increase of irrigation.

Sir F. H. Stewart.—Q. When was this arrangement made between the Bombay Millowners' Association and the Government?—A. About four years ago.

Q. What were the conditions of it?—A. That Government were to guarantee all the American cotton grown being sent to their gin and they would gin it and give the market price for the cotton.

Q. Have they been getting any cotton?—A. They had been getting quite a lot, but, other buyers stepped in and took it away from them.

Q. Who are not members of the Association?—A. Yes.

Q. Was the arrangement entered into with the Association as such or with certain members of it?—A. With the Association.

Q. When other buyers came along and took it away, did the Government allow it?—A. It could not prevent it. It had no hold on the outside buyers.

Q. Did you make the arrangement?—A. I had nothing to do with the arrangement. It was made by the Director of Agriculture and Government of Bombay. I had nothing to do with it at all.

Q. Were you responsible for seeing that it was carried out when it was made?—A. I was responsible for carrying it out.

Q. It has not been carried out?—A. No.

Q. And it is supposed still to be in existence?—A. The arrangement has been altered. The managing firm failed.

Q. I do not quite understand what the position is now. Is the arrangement still in force?—A. They have got a new arrangement. Now the Director of Agriculture is one of the managers. Before that he had no voice at all. The arrangement was made direct with Government and Messrs. Greaves Cotton, the managing agents on behalf of the Mill Owners' Association.

Q. Has the Government guaranteed that the millowners should get this cotton?—A. There is no guarantee now. It was found unworkable.

Q. So that, in effect, the millowners have erected these gins to no purpose? The whole thing has fallen through?—A. But they are valuable as gins too.

Q. About your remarks with reference to the erection of wheat elevators and the establishment of legal Government grades of wheat, what would be the attitude of the cultivator?—A. He would be pleased if he would get better prices.

Q. As regards the trade?—A. I think the trade would not like any disturbance.

Q. But the trade is interested in improving the quality of Indian wheat, is it not?—A. They are quite pleased with the existing circumstances.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. Do you think that if the Sukker barrage is built there is any possibility of growing American cotton there?—A. Yes.

Q. Have you tried the Egyptian seed?—A. We started with Egyptian seed.

Q. It failed?—A. It grew well, but it was a matter of irrigation. We could not get sufficient water. It is a six months crop.

Q. There was also difficulty in growing American cotton, because it was not possible to get seed in the Mirpurkhas district where it was started?—A. We got seed direct from America to start with.

Q. You had not much cultivation for the last two years?—A. We got our seed cultivated

Q. How much was the crop?—A. I am not now in Sind.

Q. You say, "The policy of this firm is to avoid speculation in cotton and whatever is bought in Sind is sold simultaneously in Liverpool." They fix the rates?—A. Yes.

Q. If more people come in there will be more competition and the cultivators can get better prices for their cotton, because in every cotton district when there are more than two or three people the cultivators get better prices?—A. They have got a hold over the whole of the export trade in Sind.

Q. They have got the monopoly and so they give what prices they like?—A. I think on the whole it is a fair price.

Q. Do they advance money to the cultivators?—A. No.

Q. You say, "Government intervention in the case of export crops is considered necessary in many countries and has done much to raise the standard and uniformity of export production"?—A. Take the case of dairy produce in Australia. The cheese has got to be examined and if it is not of a certain standard it is not allowed to leave the country.

Q. It must have a certain standard?—A. Yes.

President.—Q. Can we get the regulations governing the export of dairy produce from Australia?—A. It is quite easy to get them.

Sir D. J. Tata.—*Q.* Is the saw-gin used in America for ginning?—*A.* For all except the Sea Island cotton which is roller ginned. This is very long stapled, and must have a roller gin.

Q. Sind cotton is very short stapled?—*A.* Desi is very short indeed.

Q. What gins are used for desi?—*A.* Platt's double knife gins.

Q. For American cotton you recommend the saw-gin?—*A.* Yes.

Q. It is a longer stapled cotton than desi?—*A.* Yes.

Q. Has any attempt been made to improve the staple of the desi cotton in any way?
—*A.* Yes. By selection.

Q. With reference to Egyptian cotton, do you say the experiment has failed?—*A.* It has proved that it will grow very well, provided you have got water.

Q. How long has the experiment in growing Egyptian cotton in Sind been made?
—*A.* It started in 1904 and a small quantity is still grown for demonstration on the Government farm.

Q. It was attempted at first on the sewage farm Karachi?—*A.* Yes.

Q. The conditions in Sind are more approximate to the conditions in Egypt than anywhere else in India?—*A.* Yes.

Q. You want silt to be brought down, and the sewage farm served the same purpose?
—*A.* The sewage farm is suitable and there is plenty of labour. The cultivation required for the Egyptian cotton is very much more than for desi cotton.

Q. When the Nile is in flood it brings down silt, and that gives a sort of peculiar manure, and the sewage farm form of cultivation is nearer to that system than ordinary irrigation?
—*A.* In the north of Egypt where they get perennial canals there is very little silt, and even then the crop is a very good one. The results come from a better treatment of the soil.

Q. Have any experiments made tended to increase the output of cotton per acre?
—*A.* We have got very big yields on some of the Government farms. Attempts are being made in that direction.

Dr. E. Hopkinson.—*Q.* When did you leave Sind?—*A.* I have been away eighteen months.

Q. Can you give us approximately the figures of output from Sind of American and desi cotton for the last two or three years?—*A.* Desi cotton is a comparatively recent crop in Sind.

Q. Can you take the years 1912-13, 1914 and describe what cotton was grown in Sind in those years?—*A.* It did not vary very much in those years. I think it averaged about one lakh of bales of desi cotton. The American cotton was probably about 700 bales in 1914-15 and about 400 bales a year before it. I am not quite sure about these figures.

Q. In 1912-13?—*A.* It was very much smaller. I do not know what happened last year.

Q. The whole of the American cotton is exported?—*A.* Some was used in India.

Q. Not in a large proportion?—*A.* It is very difficult to trace it after it is sold.

Q. You suggest in your evidence that Messrs. Ralli Brothers exported everything they got?—*A.* Some was exported to Bombay and some to Liverpool.

Q. You say the cotton is sold in Liverpool as soon as it is brought in Sind?—*A.* Yes.

Q. A considerable portion has gone to Japan?—*A.* Yes.

Q. What part did you take as Deputy Director of Agriculture in promoting the growth of American cotton?—*A.* Practically the whole of it.

Q. You started growing in experimental farms?—*A.* Yes. I arranged to get seed from America and the actual buying of it was done by the British Cotton Growers' Association at Liverpool.

Q. And then you supervised the cultivation?—*A.* Yes.

Q. And I suppose you saw to the ginning being kept pure?—*A.* As much as we could.

Q. And then did you go on to give advice as to marketing?—*A.* No. We stopped at the gin.

Q. The buying agency now is the Bombay Mill Owners' Association?—*A.* Yes.

Q. The intervention of the Bombay Mill Owners' Association began when you were ready to market cotton?—*A.* Yes. They only intervened after the British Cotton Growers' Association had offered to intervene.

Q. Why was the offer of the latter declined?—*A.* Government thought it better to go to the Bombay Mill Owners' Association.

Q. The British Cotton Growing Association had been of assistance in the purchase of seed? They bought seed entirely for you?—*A.* Yes.

Q. And as a next step you declined their further help? Can you suggest any reason?
—*A.* To promote an Indian Association as against a British Association.

Q. The object of the British Association was to sell at the best possible price?—*A.* Yes.

Q. Do you think that it was discussed whether competition between two selling agencies might be desirable?—A. I think the idea was that when an Indian Association offered to do the work, it was fair to give the work to them. The British Cotton Growers' Association are still giving us such assistance as is in their power. They send us valuation reports of various cotton. Any seed that is not required for sowing next year is bought locally and is used for cattle feeding.

Q. There is no necessity to import seed now?—A. There might be in the future if local seed got mixed with desi.

Q. With respect to the Bombay Association, are they still continuing to gin the crop?—A. Yes. Under the new agreement it is still going on.

Q. Is all cotton a three-year crop in Sind?—A. No. It is grown one year and the land lies fallow for a couple of years. That is the usual custom. It is not necessary to leave the land fallow. If there is water, they may take a crop between.

Q. With an increase in irrigation that would be altered?—A. Yes.

Q. And it will be an annual crop?—A. It is bound to be. It is only picked for one season and then it is generally eaten by the cattle.

Q. Is it ever ploughed in?—A. It is very difficult to plough it in, because it is very woody.

Q. You say that when you were in Sind you knew nothing about what was going on in the Punjab and when you went to visit the Punjab, what did they know of your work in Sind?—A. They knew nothing of what was going on in Sind.

Q. The two provinces are as far away as the poles?—A. Yes.

Q. How did you publish your results in Sind?—A. They are published through the Director of Agriculture, Bombay, in the form of bulletins and annual report.

Q. The same system applies in the Punjab?—A. Yes.

Q. In the Punjab do they publish any bulletin?—A. There are no bulletins, but there are annual administration reports.

Q. You have not seen them?—A. In any case they did not start American cotton as soon as we did in Sind.

Q. You have now got to know what is going on in the rest of India?—A. You are not confined to one province but you have to find out what is going on in the various provinces.

Q. Is it the practice of your department to study the publications of the Local Governments?—A. A tremendous mass of publications comes in, and you have to select what you are particularly interested in.

Q. Does Pusa take any part in bringing Sind and the Punjab more in touch with each other?—A. I think it does, because I have just come down from the Punjab and I know exactly what they are doing. In the next month I may go to Sind and then I will tell them what I have seen in the Punjab.

President.—Q. Who looks after your farming arrangements at Pusa during your tour?—A. I try to arrange that the cold weather crop is sown, and then I tour. There is a cotton specialist, Mr. Gammie.

Q. Is he doing any of your work. Are your duties overlapping?—A. He has devoted much attention to the south,—Bombay, Madras and the United Provinces.

Q. Are you in constant touch with him?—A. I have not been enough at Pusa. Pusa is not a cotton country. His headquarters are at Poona.

Q. He did not interfere with your work in Sind?—A. He came to Sind once or twice, and then went to the Punjab.

Q. Did he not bring you in touch with what was going on in the Punjab?—A. When he came I was on leave and some one was acting for me.

Q. You had in Sind other duties to attend to besides cotton?—A. Yes.

Q. Would cotton questions alone be sufficient for you to take up in Sind and the Punjab in addition to Mr. Gammie?—A. It is too soon to have a special man.

Dr. E. Hopkinson.—Q. How often does the Council at Pusa meet?—A. The Council at Pusa meets once a month. I have attended two meetings since I have been there. I have been there only six months.

Q. You refer to the Imperial Institute being able to give valuable valuations and reports?—A. Yes.

Q. You speak of your own experience?—A. Yes.

Q. In respect of cotton?—A. Cotton and other things. In a case like wheat, specially soft wheat for Macaroni I sent some samples to them and they sent them to Naples and got me into touch with people there and gave me trade valuations in Italy.

Q. What have they done for you in connection with cotton?—A. They have given frequent valuations of Egyptian, American and desi cotton.

Q. Where do they get valuations from?—A. They send it on to some of the brokers in Liverpool.

Q. You have the sons of zamindars as your students. Do you get them to work themselves with their own hands on the farms?—A. If we find a boy is not inclined to work we ask him to go away.

Mr. A. Chatterton.—Q. The American cotton depends upon the improvement of facilities for irrigation?—A. Yes.

Q. The Sukker barrage will take many years to construct?—A. About 10 or 12 years.

Q. And in the meantime you are entirely dependent on these inundation canals?—A. There is one big perennial canal on the Punjab system.

Q. When is the cotton sown?—A. The Sindhi sows it in the beginning of June. We are advising him to sow it at the beginning of April when water is available. The Sindhis pay combined assessment which includes revenue and water rate for each crop. It varies in different villages. It is about Rs. 3-8-0 an acre for cotton.

Q. What yield per acre of American cotton do you get?—A. Five or six maunds per acre.

Q. Does that yield much profit to the ryot in a normal year?—A. Rs. 12 or 13 a maund is a very good price.

Q. And he could afford to pay a higher water rate than he now pays?—A. All the cultivation is done by the annual tenant and the zamindar takes half the produce as a rule and the cultivator the other half.

Q. So long as these inundation canals are in existence can water be supplied by pumping?—A. The value of land is so low that I do not think that any form of pumping will ensure profit.

Q. Has that matter been gone into?—A. Engingeers have gone into that.

Q. In an ordinary season is there much water left in the river which may be brought to the inundation canals by pumping?—A. The population is fairly limited and I think the water is quite sufficient for the population existing at present.

Q. If you put in a perennial system of irrigation you will have to introduce people into the country?—A. Yes, from the Punjab.

Q. Can you tell what the duty of water is under the cotton crop?—A. About 70 to 80 acres. It is very low.

Q. Are the crops standing in water, or are they irrigated?—A. It is periodic. In June it is very hot and it is watered once in ten days.

Q. Why should it be so low?—A. The soil is absorbent and there is terrific heat.

Q. What percentage of lint do you get from American cotton?—A. About 32.

Q. Have any attempts so far been made to introduce irrigation by pumping from the canals?—A. We have got a farm which is irrigated exclusively by a pump and a portable engine on the river.

Q. Have you any data as to the cost of irrigation in this way?—A. Yes.

Q. How much did it cost?—A. It came to Rs. 20 an acre.

Q. Is that too high a rate for extensive cultivation?—A. You can get flood water from the canals for Rs. 3-8-0.

Q. Instead of the preparation of a very much larger scheme of perennial irrigation, can you not instal pumps much cheaper so as to gradually extend the area under cultivation?—A. Most of the areas is under cultivation at one time or another, but you have got the fallow system. With the perennial canals these fallows will be cut out.

Q. Can you begin to cut them out by introducing an artificial means of lifting water?—A. With inundation canals half are fallow already.

Q. How long do they flow?—A. For four or five months.

Q. From the agricultural point of view would a perennial system of irrigation be of greater value than inundation system?—A. If you had the population, perennial would be much more valuable.

Q. What system of cultivation would you introduce if you had perennial irrigation?—A. A constant succession of crops all the year round.

Q. For instance, in Egypt they get an yield of Rs. 300 or 400 an acre for cotton?—A. Yes.

Q. If it costs Rs. 20 to pump water will it not pay to introduce pumping methods?—A. When they get the perennial canal completed they would give concessions of land and the land would be pretty cheap.

Q. It will take 10 or 15 years?—A. Yes.

Q. The whole scheme is hung up at the present time?—A. Yes, for financial reasons on account of war.

Q. Would it not then be advisable to direct attention to the possibilities of pumping with a view to ascertaining whether it is not possible to get a much higher water rate for the water?—A. There has been a good number of these pumps.

Q. Is this irrigation work under the Agricultural Engineer of the Government department?—A. It was started before I was appointed.

Q. Was he exercising any control over them?—A. No, but he advises when he is asked to do so as regards new installations.

Q. Is there any organised system by Government to try and develop work in this direction?—A. No. If any one asks us for advice we examine the scheme for him and send it to the engineer.

Q. In this case is the lift very high?—A. Round Karachi it is quite small about 20 feet maximum.

Sir D. J. Tata.—Q. Is any attempt made to popularise manures?—A. We have done more in the way of green manure and leguminous crops. We have used artificials to a large extent but we do not recommend them to the outside in the mean time.

Q. Are not oilseeds used as manure and is there any attempt made to retain them in this country?—A. Oilseeds are more used for feeding than manuring.

Q. I meant cake. You said that oil seeds were exported more, if the oil could be pressed and the seed cake used for manuring would it not be more serviceable?—A. It is a case of supply and demand. It does not pay.

Q. Have you been able to demonstrate it one way or the other?—A. We have been using ordinary oilseed for feeding regularly.

Q. With regard to the selling of cotton being entrusted to an Indian agency, is it not possible that the idea might have been that all the cotton could be used in this country if the work was entrusted to an Indian agency? If it was given to an English agency they would export it?—A. They would not necessarily export. They would sell it in India if they got a better price. They offered to do that.

Q. Have you any knowledge of the experiments made by the late Mr. J. N. Tata? He tried to get cotton grown on the Egyptian system from seed supplied by him?—A. I started the growing of Egyptian cotton on the farms on the Egyptian system, but I altered it considerably later because we could not get labour. The Egyptian cotton is purely an irrigated crop. Mr. Tata sent Egyptian seed to non-irrigated areas, and therefore his experiment to introduce Egyptian cotton failed.

President.—Q. Can you give us an idea of what fertilisers are acceptable in Sind that would be absorbed in any quantity?—A. None for a long time yet—except to a limited extent round centres like Hyderabad and Karachi.

Q. Is that due to economic reasons or due to the special condition of the soil?—A. Partly due to the condition of the soil. Nitrogen is the limiting constituent and you can get nitrogen more cheaply by the growth of leguminous crops.

Q. You do not recommend, from your knowledge of the place, the use of any fertilisers?—A. Not in general cultivation.

Q. In intensive cultivation what fertiliser has been found to be suitable?—A. Nitrate of soda. Potash manures are not required for that class of soil.

Q. Do you know whether potash has been found to be of any value as fertiliser in any parts of India?—A. In parts of Assam.

Q. But not in general agriculture anywhere?—A. No.

Q. Is that due partly to the fact that the soil is already charged with potash?—A. Yes.

Q. For instance, in Bihar where potash is a product of the soil in the form of potassium nitrate?—A. Yes. My work in cotton has been published in a bulletin and I shall send you a copy of it.

WITNESS No. 122.

Mr. H. E. Annett.

MR. H. E. ANNETT, *Agricultural Chemist to the Government of Bengal.*

WRITTEN EVIDENCE.

Demonstration
factories.

In my note on the remarks for the "Preliminary note on the scope of enquiry by the Indian Industrial Commission," which I submitted to the Commission through the Government of Bengal, I mentioned that there is quite a big palm sugar refining industry carried out in parts of Bengal. It is my opinion that there is quite a scope for the introduction of small plants for refining the raw palm gur by centrifugals. I have planned experiments on this point for the present cold weather.

If these turn out as I expect, then I would suggest that a demonstration factory be started for the next season.

Research abroad.

There are now a number of quite well equipped scientific institutions in India. I cannot therefore see the necessity for special arrangements for research in England. It is far preferable to appoint men to work in India at these institutions. I may instance the recent

appointments of Mr. Davis at Pusa to work on indigo problems and of myself to work on opium problems in the United Provinces. Neither of these investigations could be carried out in England in a satisfactory manner.

It has often occurred to me that efforts might be made to attract research students to India to work on special problems. There are numerous students who having passed through their university career have obtained scholarships or exhibitions of say £150 per year for 3 years. I might mention the Frank Smart studentships, 1851 Exhibitions and the recent scholarships instituted by the Agricultural Development Commissioners. The holders of these latter particularly have hitherto worked for two years at an English University and then for one year on the Continent. They could acquire useful experience and have a wide choice of subjects in India. The amount of their scholarships would however have to be supplemented in some way or other. Thus I would suggest that Government pay their travelling expenses to India and return *plus* perhaps a small allowance.

Q. 24.—I suggest some such scheme as the following :—A science board should be formed for each province, which could be nominated by Government and should consist of a number of well qualified science men. That body would keep a list of all the provincial science workers. When a problem came forward for investigation it could be circulated to the members of the board or they could meet together and it could then be referred for investigation to the man considered most suitable to tackle it.

I do not think the Indian Science Congress could be a sufficiently representative body to do this work. I feel that a provincial board, having a more limited field of choice could be much more capable of allotting an investigation to a suitable man.

Q. 41.—(1) I might note here that I have little faith in the figures published annually purporting to show the crop production in Bengal. In the absence of a large and efficient revenue staff, such for instance as is found in the United Provinces, there seems to be no possibility of arriving at even an approximate figure for crop production in Bengal. The absence of such a staff is directly due to the permanent settlement. The figures at present published may be more or less relative from year to year but this is all that can be said for them.

(2) There are a few places in Bengal where perhaps cane factories might be successful but for the impossibility of the factory to obtain control of its own land and hence though Bengal is said to produce 10 per cent. of India's sugar, I see little prospect there for cane factories.

(3) I have, however, advocated the probabilities of the success of date palm sugar factories. This is because I think the difficulties of handling palm juice tend to rule out of court large estates. Thus I think 100 to 500 acres would be the best sizes for palm sugar estates. Moreover, it would be easier to obtain these smaller estates than the 2,000 to 3,000 acres required for a cane sugar factory.

Acquisition of land I may mention frequently arouses bad feeling in a district and this would tend to cause difficulties to a factory management. If, however, Government wants to increase her sugar output she must aid in the establishment of these factories. Possibly eventually, as in some of the German beet sugar factories, the cultivators might be induced to take shares in such factories. Government might even go so far as to purchase shares in a factory for allotment to cultivators whose lands have been acquired.

In my note on the palm sugar and alcohol industries attached to this note, I have recommended that a special fermentation chemist be appointed to take up work in connection with the palm sugar and alcohol industries. I should imagine that each province could do with a fermentation chemist. I know that the Excise Department in Bengal are frequently in need of someone to whom they can take various investigations. Imperial technical and scientific departments.

Q. 74.—I do not consider that any measures need be taken to co-ordinate and prevent unnecessary overlapping of the research activities in Government technical and scientific departments, special technological institutes and university colleges. I do not think there is likely to be any real overlapping. By any such action as is hinted at scientific work would, in my opinion, be hindered. Co-ordination of research.

Q. 77.—Every encouragement should be given to the Government technical and scientific experts to study conditions and methods in other countries. Knowledge obtained at first hand is of far greater value than that obtained from literature. The trouble is that if one advertises the fact that one is studying a particular subject for the benefit of one's own country that certain countries will not welcome such visitors. I may instance Java with the sugar cane industry and Turkey, even in pre-war days, as regards tobacco and opium poppy culture where such visitors would not be warmly welcomed. Study of foreign methods.

It occurs to me that there are certain Government scientific libraries in India which are unknown to the ordinary worker. It might be of advantage if Government made a register of all libraries. It would also be of advantage if a list were made of all sets of scientific periodicals arranged according to country of publication and subject and stating which Indian libraries contained each. At present one frequently wishes to consult a journal not in one's own library and has no idea where to find it in India. Reference libraries.

Qs. 110 and 111.—In my note forwarded to the Commission through the Government of Bengal, I have already set out views on the development of the palm sugar industry and alcohol manufacture.

Q. 113.—As set out in my note referred to above, the fruit of the sundry tree, which grows in the Sunderbans, is very rich in starch, is very abundant and should be a cheap source of alcohol.

Remarks on the "Preliminary note on the scope of enquiry by the Indian Industrial Commission."

The remarks I am submitting herewith refer mostly to the sugar and alcohol industries and apply to the following paragraphs of the note:—

- 11 (d) Sugar and alcohol manufactures.
- 17 (h) Pioneering industries and handing them over to private companies.

As regards—

- 19 (h) My opinion is that there is at present no need to adopt measures to prevent unnecessary overlapping of research activities by technical departments, special technological institutes and university colleges.

Palms as a source of sugar.

1. *Sugar production.*

A.—Introduction.

Numerous species of palm trees are used in different parts of the world for the production of sugar and alcoholic beverages.

India, however, is the country in which the production of palm sugar is of chief importance. According to a competent authority, the *late Mr. Noël Paton, Director General of Commercial Intelligence, palm sugar represents 17 per cent. of the total sugar production in India. My own investigations enable me to state that the proportion is certainly not below 10 per cent, which equals roughly 250,000 tons. Somewhere approaching 100,000 tons of this is produced in Bengal alone.

Most of this sugar appears on the market as gur or jaggery. In Madras, I find that nearly 30,000 tons are annually bought by European firms for refining purposes.

In Bengal, Cossipore Sugar Works purchase a considerable amount of high grade native palm sugar for refining purposes.

I might add that Mr. Noël Paton put the annual output of refined commercial palm sugar in India at 64,230 tons valued at nearly 1,000,000 sterling.

It seems strange that an industry of this magnitude should have received so little attention. I first turned my attention to it in 1911 and in 1913, I published a memoir entitled "The Date Sugar Industry in Bengal" which appeared as a departmental memoir of the Department of Agriculture in India. This paper gives an account of the history and development of the industry and of its commercial aspect among other more scientific matters. I have recently been able to devote more attention to the matter and my experiences convince me that the matter is one for consideration by the Indian Industrial Commission.

I feel that there is room for a special establishment to deal with the question. At present it simply forms a branch of my work.

The important sugar producing palm in Bengal is the wild date. This is grown in plantations. 350 trees per acre can be planted and these at a conservative estimate should yield $3\frac{1}{4}$ tons of gur per acre. The average yield of cane gur in India is stated to be under 1 ton per acre. The advantages in favour of date palms are:—

1. The low annual cost of cultivation.
2. The trees will bear continuously for 40 to 50 years.
3. One is certain of a normal crop year by year and is independent of drought or flood.
4. Different palms yield their sugar at different seasons of the year. Hence a very long season is possible.
5. No crushing mills are needed to expel the juice.

To my mind these advantages will more than outweigh the disadvantages which are:—

1. That the trees are not ready for tapping until 5-6 years after planting the seeds.
2. That fuel will for the most part have to be purchased since there is no megass as in the case of cane.

B.—Palms are a cheap source of sugar.

The fact that a matter of some 50,000 tons of raw palm sugar and jaggery is annually used for refining in European sugar refineries in India would seem to indicate that palms are a paying source of sugar. It is certainly a fact that on the basis of sugar content palm gur

* Notes on sugar in India, 1911, by Mr. Noël Paton.

and jaggery are much cheaper as a source of refined sugar than is cane gur. The following analyses and prices will illustrate this point:—

	Palmyra jaggery from Madras. Per cent.	Date palm gur of Jessore. Per cent.	Cane gur bought for refining at Tarpur Sugar Works. Per cent.
Sucrose	73 to 75	67 to 78	75
Reducing sugars	1 to 4	3 to 8	7
Price per md. of 80 lbs.	Rs. 2-13-0(a)	Rs. 2-12-0(a)	Rs. 6-0-0(b)

It is further to be noted that there has been no upward tendency of prices during the period of about 16 years immediately preceding the present war.

The following figures are of interest in this connection. A European factory which refines large quantities of palm jaggery also refines cane jaggery and Mauritius and other sugar as it can get them. Early in 1915 this firm paid the following prices for these various materials. The refining value of each kind of sugar is also stated:—

	Refining value.	Price per maund of 80 lbs.		
		Rs.	A.	P.
Palm jaggery	54 to 56	3	3	0
Cane jaggery	48	*5	15	0
Mauritius sugar	60	5	15	0

Palm jaggery is here seen to be easily the cheapest material of the three.
It is only fair to remark that the price paid for Mauritius sugar was considerably above pre-war rates. Palm jaggery has, however, increased but little in price as a result of the war. The fairly uniform price of palm jaggery from year to year is another point in their favour.

C.—Early English palm sugar factories.

Sugar factories have been established in Bengal at various periods from 1830 to the early eighties. Some of these worked at a profit for some time but they had many difficulties to contend with. One of the first great blows was in 1846 when Parliament decided in the case of sugar only to encourage slave labour and again shortly after this duties on all sugars from all parts of the world were equalised.
Another reason why these factories did not continue to be successful was that the demand for native refined sugar was greater than that for the first rate sugar manufactured by European means and the Europeans lost the trade.

Sugar manufacturing machinery has undergone vast improvement of recent years and a factory which would now be erected would work much more economically than those of the earlier days.

D.—Modern sugar factories.

1. *Tarpur Sugar Works.*—This is a swadeshi company which has within the last few years taken over old works which were originally built in 1853. The works were renovated some 20 years ago. I have seen really good sugar produced there direct from the date juice. The factory, however, had to buy juice from cultivators and under these circumstances they could not get enough to work their vacuum pan economically. To my mind it was a pity that the money put into this venture was not invested in a more compact and recent factory. It is important that a factory has control over trees of its own.
The factory has recently been working as a refinery dealing with date gur and with cane gur imported from the United Provinces.
2. *Nellikuppam Sugar Factory.*—This is situated in South Arcot, Madras Presidency. The factory is run on exceedingly sound lines and works up some 2,000 acres of cane per season. In addition to this it refines very large quantities of palmyra jaggery which it imports from all parts of Madras by means of agencies established at various centres. Messrs. Parry and Co. are agents for this factory and they have a large factory in Tinnevely where they make jaggery themselves direct from palmyra trees.
3. *Samalkot Sugar Factory.*—This is situated in Godavery District, Madras Presidency. It refines imported and indigenous sugars but depends chiefly on palmyra palm jaggery. Both Nellikuppam and Samalkot have distilleries attached to them.

(a) Price received by cultivators.
(b) This includes cost of carriage from United Provinces.
* Price asked by cultivators and not actually purchased by factory as rate is considered too high.

E.—Proposals.

There are two lines of work in Bengal which I propose :—

1. *The improvement of the native industry :—*

- (a) My own work has shewn that if the Bengal cultivators take up the practice of liming the pots in which they collect the juice that the yield of gur might be increased something like 20 per cent. Liming is universal in Madras.
- (b) By introducing a more economical furnace :—My own work has shewn that there is considerable wastage of fuel.
- (c) There seems reason to believe that centrifugals might be introduced for refining the gur. At present very wasteful native refining processes are in use. This native refining industry is a very large one.

2. *The establishment of an up-to-date white sugar factory for the production of sugar direct from the juice.*—I may mention here that it is unlikely that large central cane sugar factories will ever be possible in Bengal since it would be impossible for such a factory to get control over a sufficient area of land several thousands of acres for one factory.

I believe, however, it is possible in the case of the date palm industry to establish very paying factories to deal with the produce of one to five hundred acres. It is a factory such as this which I would like to see established. It seems to me, however, that Government would have to start a pioneer factory. The experiment would cost Government at least a lakh of rupees but a good part of this would be recovered by sale of the factory if it were a success.

If it be considered that the industry is worthy of investigation, then a special scientific officer with competent staff would have to be entertained since there are numerous lines of work which promise to be of benefit to the industry.

I might suggest that this same staff could probably help the Excise Department with investigations dealing with fermentation. Investigation of the nipa palm and of the fruit of the soondry trees as sources of alcohol are cases which immediately occur to me.

Sources of alcohol.—1. Nipa palm (nipa fruticans):—Gibbs in the Phillippine Islands has of recent years performed much valuable work on the subject of the use of certain palms for alcohol production. In the Phillippines the nipa palm (nipa fruticans) is a very important source of alcohol.

The following table shows how the production of alcohol from nipa palms has been increasing in these islands :—

	Gallons of proof spirit.
1905	594,000
1906	1,210,000
1907	1,650,000
1908	1,740,000
1909	1,870,000
1910	2,134,000

The following table compiled by Gibbs * shows the comparative figures as to the cost of production of alcohol from various sources. The cost is given in U. S. dollars and the cost given in the table refers to the cost of the raw material required to produce one litre of 100 or of 180 proof spirit, respectively.

Source.	Cost of raw materials required, to produce one litre :—	
	100 proof.	180 proof (90 per cent. alcohol).
Sugar beets at \$ 4.75—5.00 per ton	\$ 0.032	\$ 0.058
Sorghum stalks at \$ 3 per ton	0.032	0.059
Sugar cane at \$ 3 to 3.25	0.028	0.050
Beet molasses at \$ 15 per ton	0.028—0.029	0.050—0.053
Cane molasses at \$ 0.12 per gal.	0.032	0.059
Jerusalem artichokes \$ 5 per ton	0.027	0.048
Cassava at \$ 5 per ton	0.019	0.034
Potatoes at \$ 4 per ton per culls	0.021	0.037
Sweet potatoes at \$ 8 per ton	0.031	0.056
Barley at \$ 0.65 per bush. of 48 lbs.	0.041	0.074
Maize at \$ 0.70 " " 56 "	0.037	0.066
Oats at \$ 0.35 " " 32 "	0.046	0.082
Rye at \$ 0.80 " " 56 "	0.051	0.092
Nipa at \$ 0.00389 per litre equivalent to 6.5 per cent. alcohol	0.015	0.027
Cocoanut at \$ 0.005 per litre equivalent to 6.5 per cent. alcohol	0.0384	0.069
Cocoanut at \$ 0.0063 per litre equivalent to 6.07 per cent. alcohol	0.0488	0.088
(Actual case of one distillery).	—	—

* Phillippine Journal of Science, 1911.

Gibbs concludes that nipa sap is the cheapest source of alcohol in the world. The nipa is a swamp palm which grows gregariously about the mouths of tidal rivers. In the Phillippines large swamp areas are covered by natural growths of this palm. It also grows very commonly in the Sundarbans. I have myself seen plantations at Cox's Bazar and have examined the juices chemically. At Cox's Bazar country liquor is made from the juice. In the Phillippines the tendency has, of recent years, been in the direction of replacing the old pot stills by large up-to-date distilleries.

Gibbs quotes the case of one distillery which is producing 93 per cent. alcohol (186 proof) at a cost of 0.10 peso per litre with their plant running 12 hours per day. This is equivalent to 11.4 annas per gallon. On a 24 hours basis with the introduction of some additional economies Gibbs says that this grade of alcohol could be produced at 0.07 to 0.075 pesos per litre i.e., 8 annas per gallon. These figures include the over head expense of the distillery and nipa groves.

Suggestions.—It certainly seems that we have in the nipa palm an exceedingly cheap source of alcohol. The nipa palm flourishes on land which is practically useless for anything else. I suggest that a survey of the existing nipa palm areas and of areas suitable for their growth be taken up in Bengal.

2. *Soondry tree fruit.*

I understand that the fruit of the soondry tree which grows in profusion in the Sundarbans is very rich in starch and that the Excise Department are of opinion that a nipa distillery might also utilise this substance. I therefore also think that information should be collected as to the amount of soondry fruit available. By means of the amylo process a very cheap alcohol should be produced from this substance.

3. *Date sugar molasses.*

A considerable amount of this substance is annually bought by large distilling firms. At present the annual variations in price are very large as the following table will show:—

Season.	Price per maund of 80 lbs.		
	Rs.	A.	P.
1898-1899	1	15	0
1899-1900	2	1	0
1900-1901	2	4	0
1901-1902	1	13	0
1902-1903	1	8	0
1903-1904	1	11	0
1904-1905	2	1	0
1905-1906	2	13	0
1906-1907	1	11	0
1907-1908	1	15	0
1908-1909	1	12	0
1909-1910	2	0	0

It will be of interest to work out the cost of the date molasses required to produce one litre of proof alcohol in order to compare it with the cost of other raw materials as set out in Gibbs' table above.

One maund of date molasses will easily yield 4 gallons of 100 proof spirit. This equals 18.2 litres. If we take Rs. 2 per maund as the price of the molasses then we find that one litre of proof spirit costs us 1.75 annas or in the terms of Gibbs table \$0.035. It has been stated, however, by a man in the trade that to a sugar factory with its own distillery the cost of the molasses would not be more than Re. one per maund and with this view I agree. Under these circumstances, the raw material required to produce one litre of proof spirit would not cost more than 0.018 and would almost rival nipa palm sap in Gibbs' table as the cheapest source of alcohol.

Suggestions.—To my recommendation for the establishment of a sugar factory I would add that a distillery should be run in connection with that factory. I know of one European firm of standing who would probably take the matter up, provided Government gave them certain reasonable facilities.

Under the present conditions of spirit manufacture from Bengal date molasses the sugar manufacturer after having used primitive and wasteful methods for the production of this sugar has to make a big profit on his molasses. The distiller in turn has to make a profit. If the distillery were attached to the sugar factory it is obvious that the alcohol could be produced at a much lower rate.

ORAL EVIDENCE, 8TH DECEMBER, 1916.

President.—Q. I want to know from you if this system of scholarships that you refer to would be responded to if we developed it by bringing out from home men of the demonstrator •

and assistant lecturer class, possibly even post graduate research students?—A. I have often thought of the scheme myself. When I was at home on study leave I met quite a number of young people who were doing post graduate work. It struck me that it would be an extremely good thing if they could be given an opportunity of doing their post graduate work in India. They would have to be carefully selected.

Q. Is it not a fact that in trying to recruit young men they will not commit themselves to a full service, but will come out for a short period?—A. That will be one of the conditions, but Government might approve their work and make it worth their while to stay.

Q. The working of that system is not convenient under the ordinary service regulations. If a man comes out for a short period he has one eye on his work and one eye on something else. We might get over that difficulty by instituting a system of scholarships that would induce the man to take an interest in the work and that would give suitable recruits for the scientific and technical departments?—A. That is my idea.

Q. Do you think there are enough problems to engage their attention?—A. There are plenty of problems.

Q. You suggest that each province might be provided with fermentation chemists. That of course would not apply to the smaller provinces. Do you think there would be enough occupation for eight or nine fermentation chemists in the country?—A. I could hardly go so far ahead as that. After the scheme is started you would then be able to say. There are two or three provinces however which want men straight away. Bengal ought to have one and United Provinces another. Madras can have one. I think work can be found for five.

Q. With reference to your suggestion that Government scientific libraries might be better known, it has been suggested to us that there ought to be a sort of library census in India with descriptive card catalogue of the contents of each library. Would that appeal to you as a suitable way of bringing these libraries into greater use?—A. As long as they are sufficiently advertised.

Q. If there were a central authority to whom we could write for information as to what literature to get on any subject would not that be a good thing?—A. That would mean the establishment of a special library organisation.

Q. Don't you think that you want an organisation if it is going to be of any use?—A. That would mean a very large organisation. There are doubtless several excellent scientific libraries in India very little known to the majority of workers. Thus we have an excellent one at the Agricultural College, Cawnpore. More libraries of this type would be useful.

Q. If library catalogues are issued in pamphlet form they become buried like the agricultural bulletins. They are not read by anybody?—A. What I think is there ought to be some one to whom we should be able to write for information.

Q. Do you think a central organisation would be more efficient?—A. I do.

Mr. A. Chatterton.—Q. About the development of date palms as a source of sugar, is there any difficulty in Bengal in regard to the operations of the Excise Department?—A. None in Bengal.

Q. Do date palms require any particular soil for a vigorous growth?—A. I have seen growing on all kinds of soil.

Q. Has the yield of juice any relation to the soil?—A. I have no evidence at all on that point but the people in the palm districts think it has.

Q. Is growth in any way effected by rainfall?—A. In the places where there is much less rain certainly the palms are not so flourishing. Bengal palms are more flourishing than those of Central India.

Q. How do the Bengal cultivators boil the juice?—A. In ordinary earthenware pots in the ground.

Q. What kind of jaggery do they make?—A. It is rather a solid rab. It is not quite so liquid as a rab and it is not a solid gur. It is rather thick.

Q. Is any gur worked up in refineries?—A. In Bengal gur is only bought by the Tarpur Sugar Works for refining and a very large quantity of it is refined by native methods. I should think 20 to 25 per cent. of the total gur is refined by native methods.

Q. What process do they use?—A. The gur is beaten up just to mix it up with sugar crystals and it is placed in a big basket holding two or three maunds and it is allowed to drain for a week. The molasses drains away below. They put water weed to a depth of two inches and allow the process to proceed for another length of time and the top two or three inches in the basket become whitened. We work it in this way until the whole process is finished.

Q. Have you tried to introduce refined methods?—A. I refined a few maunds last year. We had absolutely no difficulty in getting crystals.

In regard to your remarks about the manufacture of cane jaggery in Bengal have any experiments been made to improve on the indigenous methods. There is nothing at all being done in the way of improvement.

Q. Is the cultivation of sugar cane at all concentrated in any parts of Bengal?—A. No. It is mostly in scattered areas. There are only one or two places in which cultivation is concentrated.

Q. The cane is crushed in bullock mills?—A. Yes.

Q. Have power mills been tried?—A. We were talking of putting one up like those at work in Mysore. They have just obtained a small power mill in Rangpur. They are going to try it on the Government farm and if they find that it is working satisfactorily there is an idea of trying it in the north of Mymensingh district.

Q. Is there any market in Bengal for the molasses apart from the distilleries?—A. There is fair market for mixing it with tobacco. I am afraid a lot of the molasses is specially imported from Java for that purpose.

Q. At present the supply of molasses is not equal to the demand?—A. It pays the people to import Java molasses.

Q. You make suggestions about the manufacture of alcohol from the soondry tree. Has anything been done in that direction?—A. No.

Q. To test such suggestions what organisation should be arranged. Do you think there ought to be a Department of Industries in Bengal?—A. It is rather a difficult question to decide on. I consider there ought to be some board or other for considering these problems and there ought to be a man who is put on special work entirely for this.

Q. There is nobody in Bengal to deal with these questions?—A. I started the work on my own responsibility and I am now getting to a stage when the work is too much for me.

President.—Q. Is there not a great deal of routine work to be done in the laboratories in addition to these investigations?—A. There are quite a number of things to attend to. I have recommended certain improvements but in order to push them it means that I have to leave my legitimate work and go from village to village in order to demonstrate them.

Q. If you had a Department of Industries in Bengal you would be able to put forward a variety of suggestions and proposals for the development of the local products?—A. In one or two instances I could do that straight away.

Q. Would you consider it better to hand over these problems to a department of that character, which should be more or less commercial in its objects, or is it necessary to go through the intermediate stage in which these questions should be dealt with by specialists deputed from a central technological institute or from a central department of chemists to carry out the work to a further stage before any actual commercial developments are attempted?—A. I think the stage has come now when the work could go before the commercial people.

Q. Have you placed these proposals before commercial people at all?—A. Yes.

Q. Is there any prospect of anybody taking the matter up?—A. There is the prospect of one firm taking it up.

Q. Do they want Government assistance?—A. They want some guarantee for spirit contract.

Q. In a case like this before you could be justified in asking a commercial firm to take it up, Government or some body should organise the work on a commercial scale and thus bridge over the gap between the laboratory and actual commerce. That would require continuous attention on the part of the technical specialists?—A. That is why I wanted Government to come in. If Government could set aside, say, about 400 acres of land and if the test could be run (there is some risk but not very much) by Government as a test factory and were successful, I do not think there will be any difficulty in getting people to take the matter up. Of course one has to risk failure.

Dr. E. Hopkinson.—Q. Have you been lent by the Government of Bengal to the Government of the United Provinces for researches on opium?—A. Yes.

Q. How did that investigation originate?—A. There has been a shortage at home of medical opium as the opium laid down by the British Pharmacopœia must contain 9.5 to 10.5 per cent of morphine. The Indian opium is said to contain 5 to 6 per cent of morphine which is lower than the home requirement. That is the reason why this opium is of no use for medicinal purposes and now Government thinks it is a convenient opportunity to step in and take the Turkish trade. Most of the medical opium is obtained from Turkey. That was the reason that gave rise to the investigation.

Q. I want to get at this point, whether the Government of the United Provinces took this up as a commercial proposition or at the request of the British Government?—A. It was through the Financial Department of the Government of India that I was appointed. I think it was thought that there was no reason why India should not produce some of the opium the trade of which till now was in the hands of Turkey. My services have been placed at the disposal of the United Provinces Government for six months. There is no possibility of the work finishing before three years.

Q. What about your work in Bengal?—A. There is no one to attend to it. Mr. Finlow is acting for me and he is doing three men's work.

Sir F. H. Stewart.—Q. How long have you been out in India?—A. Ten years next May.

Q. If the Government were to start these demonstration factories that you suggest what amount of capital would be required?—A. I wrote home to a Scottish engineering firm. I got estimates for a factory to produce a ton of sugar a day. The cost will be 60 to 70 thousand rupees.

Q. Would you be able to get the labour in Bengal?—A. I think there would be a good deal of labour available.

Q. There would be no difficulty about that?—A. I do not think so.

Q. You say that you have very little faith in the figures regarding crop production of Bengal?—A. I do not know whether I ought to have made that remark. It is my own opinion. I have arrived at that entirely from the point of view of sugar in which I have been interested. Having seen the systems in the United Provinces and in Bengal there is no comparison between them.

Q. You cannot make any suggestions?—A. Not with things as they are.

Mr. C. E. Low.—Q. Do you know the cost at which Java alcohol could be landed in Calcutta at pre-war rates?—A. I do not remember the pre-war rates. I think it worked out to 12 annas a gallon.

Q. What degree of strength? 95 per cent. by volume that is 182 proof or something of the sort?—A. They could import it at much less. The majority of the molasses in Java is simply thrown away.

Q. Do you think that any proposition of the kind that you mention for making sugar out of these palm trees could be successful without an excise distillery behind it?—A. I think there is a possibility of success but I think that any firm who went into it would want a spirit contract.

Q. Supposing he had not got a contract for the supply of portable liquor, he will have to produce industrial alcohol. If he wanted to utilise his palm juice he would have to make industrial alcohol?—A. If he could not get a market for molasses as such.

Q. Do you think he could?—A. There is a big demand for molasses in Bengal.

Q. Java would be a serious competitor?—A. We could easily undersell them.

Q. You say there is little prospect of cane factories in Bengal owing to the difficulty of getting land. Do you know that in Bihar there are large cane factories without much land of their own?—A. That may be but in order for a factory to be successful it must have absolute control over at least one-fourth of the land on which its cane is grown.

Q. Do you think that is essential?—A. That is absolutely necessary.

Mr. A. Chatterton.—Q. Have you any experience of sugar cane cultivation in other parts of India?—A. Yes. I have been in most of the provinces.

Q. What would you consider as the best way of attacking this question of developing the cultivation and manufacture of sugar in India. Do you know the system that is being worked in the South of India. Do you consider that there is any considerable prospect of a successful development of sugarcane cultivation by the installation of small power factories for the manufacture of a higher class of jaggery or gur?—A. After I visited Mysore I came back with the idea that we might start a small factory on the same lines somewhere in Bengal. But here the conditions would be entirely different. If we could make a good class of gur none would go to the refinery. We have not so many concentrated areas. It is very hard to get 100 acres in a block. It is only in two or three places that the factory is likely to be successful in Bengal.

Q. In Bengal would there be any difficulty about putting up a central factory?—A. I do not think you could. The cane area is scattered and the growth is uncertain.

Q. They grow regularly year by year?—A. A very large portion of the Bengal cane is chewing cane. Bengal is a very large consumer of chewing cane.

Q. Do you think the lower classes of the country prefer gur to sugar?—A. This is my opinion. The lower classes prefer gur.

WITNESS No. 123.

Mr. R. S. Finlow.

MR. R. S. FINLOW, B.Sc., F.I.C., *Government Fibre Expert, Bengal.*

WRITTEN EVIDENCE.

Technical aid.

Q. 15.—I joined the Indian Agricultural Service in 1904. I first came to this country to assist in chemical research work in indigo; but I was only directly connected with this investigation for about a year. Latterly I have made a special study of fibres, principally jute.

Q. 16.—I have written a separate note in which I have dealt in detail with improvements which are possible in connection with jute cultivation. Progress in agricultural research and in the application of its results has been comparatively slow in Bengal, partly I think, because the possible improvements are not quite so obvious as in some other parts of India and partly also, perhaps, because the cultivator is, on the whole, better off and not quite so easy to convince. He is now, however, showing in no uncertain manner that he is willing to take advantage of the results obtained by the Agricultural Department, and there is no reason for doubt that ultimately all the improvements suggested by the department will come into common practice. The raiyat is also taking kindly to co-operative principles, and

co-operative credit is bound to play a determining part, at least in regard to progress in directions involving outlay of capital.

Qs. 17 and 18.—Ordinarily a scientific expert would be able to offer advice, in the routine of his official work, to a private company whose enterprise is on similar lines. If the advice required is of a very special nature, the company, if wealthy enough, would retain its own experts; but if not the advisability of loaning a Government expert to such a company would, in my opinion, depend on whether or not the development of the enterprise would be a matter of public importance. In such a case it would seem fair that Government should have the determining voice in regard to the publication of the results of researches made by the expert; but it would also seem to follow that, in the case of such a special subject, Government would, in coming to a decision in the matter, be largely guided by the views of the expert himself.

Qs. 21 and 22.—I have consulted the Scientific and Technical Department of the Research abroad. Imperial Institute on several occasions, and have found it useful in obtaining commercial information and opinions regarding various fibre products. I consider that such an organization would continue to be valuable for these purposes, but with the development of the scientific departments in India, it would seem that, in the future, technical problems will be more and more advantageously worked out on the spot by officers possessing local knowledge in addition to a scientific equipment. The worker in India would certainly generally be in a better position to obtain, or if necessary, produce under his own control, the raw material for his investigations; but here again he would probably, on their successful conclusion, receive valuable aid from an agency in England in placing new or improved products on the market. It would seem that this could well be one of the functions of an Advisory Council for Research in England. Another function would be to constitute a central bureau to which manufacturers could communicate their ideas regarding improvements in the preparation of raw products, or any other needs of their respective industries which workers abroad could help to satisfy.

Q. 24.—If any organization were required in India whose functions would be similar to that of the Advisory Council for Research in England I would suggest that an enlarged and broadened Board of Scientific Advice might serve the purpose. The Board might consist of a nucleus of permanent members, as at present; but it should have the power, if that is not the case at present, of co-opting other members whose special experience would be of value in framing a particular policy. Such members would not necessarily be scientific men; it would be of use on many occasions to have advice of a sound businessman with a knowledge of the commercial aspect of the matter under discussion. It might not prove feasible to have a commercial committee of the Advisory Council, but periodical discussions with representative men, who might happen to be commercially interested in the investigations in progress, would almost certainly prove of great help to those engaged in the research.

Q. 25.—As far as my own work is concerned I consider a further survey of the fibre Surveys for resources of India to be highly desirable. Such work could well be carried out in collabora- industrial tion with the Botanical Survey and the Forest Service. purposes.

I can make no definite suggestions regarding the exact organization of such a survey; but in the case of fibres it would probably commence with the collection and investigation of material which is likely to be of commercial value either to existing industries or possibly in the formation of new ones. The staff required for such work could only be decided by experience.

NOTE ON FIBRES.

The fibres cultivated, or capable of cultivation, in Bengal are as follows :—

- (1) Jute :—*Corchorus Capsularis* *Corchorus Olitorius*.
- (2) Sann hemp :—*Crotalaria Juncea* (Son-pat).
- (3) *Hibiscus Cannabinus* :—Mesta pat, Bimlipatam jute, etc.
- (4) Flax.
- (5) Sisal hemp.
- (6) Rhea.
- (7) Coconut fibre.

Of these jute overshadows all others in the area devoted to its cultivation and the great volume of its trade.

JUTE.

[(1) *Information contained in previous publications* :—Papers are put up from which most of the information regarding jute can be gathered.]

(2) *Distribution of C. Capsularis and C. Olitorius* :—Briefly it may be said that *C. Capsularis* is generally cultivated all over Northern, Eastern and South-Eastern Bengal; while *Corchorus Olitorius* is more common in Western, South-Western and Southern Bengal. The division is roughly a climatic one; but an increasing proportion of *C. Olitorius* has been grown on high land in Eastern and South-Eastern Bengal of recent years. This is probably due to the pressure of the largely increased area under jute in Eastern Bengal; *C. Olitorius* is sown later than *C. Capsularis* so that the cultivation of both kinds tends to

prolong the sowing season and thus enable the cultivator to conduct his operations with less strain on his bullocks and himself.

(3) *Improvements as a result of the work of the Agricultural Department* :—(a) The work of the Agricultural Department in the last ten years has shewn that considerable improvements are possible, partly through the use of the improved seed and partly through improved agricultural practice, such as the application of suitable manures.

(b) *Seed*. In the case of seed for instance :—Carefully made field tests carried out in the present season (1916), with the aid of Calcutta jute firms at their mofussil agencies, have shewn that the departmental pure line seed is capable of better yields of fibre, as compared with the various local varieties, averaging something like two maunds per acre, or say 12 per cent. There is already a considerable demand for this seed: last year (1915) about 6 tons (150 maunds) were sold, this year (1916) 13 tons (350 maunds) are available and arrangements are being made to produce about 50 tons (over 1,000 maunds) next season.

(c) *Manures*. In the case of manures :—It has been shown that the application of lime, phosphates and potash to the red soil tracts results in considerably increased yields, averaging from 2-4 maunds of fibre per acre and, in addition, markedly improved *rabi* crops. It has been proved that such treatment results in considerably increased net profits and, as a result of demonstrations, cultivators in the red soil tracts are, with the aid of co-operative banks, already taking it up. The very pronounced lack of lime and phosphates which characterizes the red soil tracts is typical also, in a modified degree, of practically the whole of North-Eastern India and is, no doubt, due to the continued solvent action of the heavy rainfall which this tract receives. Away from the red soil however, *i.e.*, on the new alluvium, it is always possible to reap excellent crops after general, as opposed to special, manuring and under such conditions the conservation of the natural supplies of manure becomes a point of great practical importance. The losses of cowdung are very great, partly through its being used as fuel and partly through carelessness in regard to the storage of the remainder, and it is part of the programme of the district staff of the Agricultural Department to induce cultivators to exercise more care than they are in the habit of doing in this respect.

Experimental trials have recently shown that the water weeds, which grow in such quantity in some of the low-lying tracts, are particularly rich in manurial ingredients and that in a rotted condition or, after burning in the form of ash, they are capable of producing such increases in the crops cultivated as will amply repay the cost and trouble of their collection.

(4) *Estimate of potential improvement rendered possible by the work of the Agricultural Department* :—On the whole the degree of potential improvement in the jute crop of Bengal as indicated by experimental results now available, would appear to be in the region of 25 per cent., but the progress towards such improvement must take many years in the absence of a large and efficient district staff.

(5) *Help of co-operative credit societies in introduction of improvements involving expenditure of capital* :—In the dissemination of new knowledge and distribution of selected seed the Agricultural Department's district staff is a sufficient agency; but when the cultivator wishes to buy improved implements and expensive manures the aid of co-operative credit is usually an absolute necessity. A new implement may cost Rs. 20 and the purchase of manures may cost as much as Rs. 25 per acre. Such expenditures might, and probably would, be recouped several times over in the course of a year or two, but there are few cultivators who can afford to pay out a lump sum of Rs. 20 or more. Therefore without the help of co-operative credit the bulk of the cultivators would be unable to take advantage of many of the opportunities which are, as the result of the work of the Agricultural Department, open to them. Instances of collaboration between the Agricultural Department and the co-operative credit societies are already on record in Bengal, and these will multiply in proportion as the increased staff of the Agricultural Department is able to demonstrate item of improved agricultural practice to the cultivator.

Extension of Jute Cultivation.

(6) *Statistics regarding jute crop* :—In considering this matter it is instructive to note the rate at which the cultivation of jute has increased in recent years. In 1874 the approximate area under jute was returned as 920,000 acres which, at 3 bales per acre, would yield 27 lakhs of bales roughly. In 1902-03 the official figures give an outturn of 66 lakhs of bales; in 1904-05, 72 lakhs of bales; in 1909, 90 lakhs; in 1910, 81 lakhs; in 1912, 100 lakhs and in 1914-15, 105 lakhs. Thus the actual amount of jute produced has increased by nearly 50 per cent. in the last ten years and the same may be taken to be true as regards the area under the crop.

(7) *Increased production not sufficient to keep down prices* :—Even this enhanced production however was apparently not sufficient; for prices practically doubled in the same period and the one cry from the commercial community was for more fibre. A reasonable conclusion to draw from this is that, in spite of unprecedentedly high prices, the present tract in which jute is produced is not capable of furnishing all the fibre which is required.

(8) *No expansion in limits of jute producing tract* :—In Hem Chandra Kerr's report, written in 1874, it is stated that jute was cultivated in all but 11 districts of the old Bengal Presidency. Only one of these eleven districts grows jute to-day and that on a very small area. Obviously therefore there has been no expansion of the limits of the tract of country

over which jute is grown, in spite of the enormous increase in actual acreage under the crop. It follows that the proportion of jute to other crops has increased very greatly in this tract. In the districts of Dacca, Mymensingh, Faridpur and Tipperah the area under jute is over 25 per cent. of the net cropped area; in Bogra, Pabna and Rangpur it approximates to 20 per cent.; while in the 24-Parganahs, Nadia, Jessore, Hoogly, Howrah and Rajshahi it varies from 10 per cent. to 15 per cent. In the whole province of Bengal jute occupies 12 per cent. of the total cultivated area.

(9) *Interdependence of the respective amounts of rice and jute cultivation*:—In this connection it is worth noting that in the period 1910-1914, which was an era of uninterruptedly high prices for rice as well as for jute, the area devoted to rice in Bengal fell by 1,700,000 acres, and the total area under food grains shews a similar decline; since the commencement of the War, which caused a shrinkage of over 25 per cent. in the area under jute, rice cultivation has shewn a rapid and progressive recovery. It is practically certain that the whole of the increased area put under jute in the period 1910-1914—roughly 400,000 acres—was at the expense of food grains; but even then there is an area of over a million acres which cannot be accounted for by the statistics available and which apparently went out of cultivation; in fact it would appear that the increased area put under jute caused a much more than equivalent reduction in the area of food crops. There are two possible explanations; firstly that the profits from jute were so great that the cultivator felt he could afford, if not to buy food, at least to stop producing more than he needed for his own consumption; secondly that the labour of producing so large a quantity of jute, the extraction of which clashes in time with the planting of rice, made it impossible to carry out the latter less profitable operation to a normal extent. Probably both of these reasons tended towards the result which, in any case, and despite a considerable increase of population during the period, amounted to a serious diminution of the staple food supply of the province. (N.B.—The population of Bengal increased by 3½ millions in the decade 1901-1911.) How far such a process can go on is a question which I do not pretend to be able to discuss in all its bearings; but although increased yields of food crops will be made possible by the work of the Agricultural Department, it would seem that, as far as present conditions are concerned, Bengal will soon reach the limit of economic safety, if it has not already done so, in regard to jute production.

(10) *Insufficient labour for increased production of jute in Bengal*:—How far the present labour supply is capable of dealing with a largely increased substitution of jute for other crops in the present jute growing tracts is of greater importance than it appears at first sight; for it cannot be doubted that jute cultivation involves considerably more labour than rice. People who have been in the jute trade for many years are almost unanimous in believing that the quality of jute brought into the market has not been so good in recent years. Of course there are spasmodic variations in quality which are due to seasons which are suitable or otherwise; but, there is a strong and general impression that outside this, there is a tendency towards continuous deterioration. That this is not due to the plant is certain; it is possible to grow as good jute to-day as ever it was and, given good retting water and careful preparation, the results are entirely satisfactory. It has already been remarked that jute cultivation involves considerably more labour than rice and the reaping of the crop and preparation of the fibre is one of the most exacting stages in its production. If, therefore, the cultivator is coming to a point when he tries to cultivate more jute than he can conveniently manage, one of the most obvious signs will be a tendency towards more and more careless preparation, and this is just what appears to be happening.

(11) *Importation of labour*:—This difficulty is to some extent mitigated by the employment of outside labour; for every year large numbers of coolies migrate eastwards from the overcrowded districts of Bihar and the United Provinces, more especially to the jute growing districts of Northern Bengal. The supply of such labour however is not only limited, but it is expensive and, through lack of experience, often inefficient. The result is an inevitable rise in the cost of production of jute as well as a deterioration in the quality of fibre obtained.

(12) *Proportion of jute to other crops in Bengal approaching its limit*:—There appears to be some reason therefore for the contention that, the proportion of jute to other crops in the jute producing tract is also approaching its limit.

(13) *Probable continued increase in the demand for jute. Methods of increasing the supply*:—On the other hand there is certainly no ground for believing that the demand for jute is likely to slacken more than temporarily, and it behoves us to examine the position in order to see how any further increase is to be met. There are three possible ways, viz.:—

- (1) By improving the yield of fibre in the present jute production area.
- (2) By extending the cultivation of jute to other tracts where it is not at present grown.
- (3) By the cultivation, in tracts which are not suitable for the production of jute of other plants whose fibre is sufficiently similar to be used as a substitute for jute.

(14) *Improved yields of jute fibre*:—Taking these points in order:—The work of the Agricultural Department must lead to considerably enhanced yields, not only of jute but of other crops by means of improved methods of cultivation and manuring. The ultimate possibilities in this direction, as far as jute is concerned, may be put at something like 25 per

cent. or, say 25 lakhs of bales; but the actual realisation of this increase will be slow, for not only are the cultivators conservative but their number is very great, their holdings small and they are spread over an area as large as Great Britain.

(15) *Possible new areas*:—Regarding new areas in which jute cultivation could extend—the natural outlet would of course be the plains of Assam which are, by reason of the prevailing conditions of soil and climate, peculiarly fitted for jute cultivation. There is indeed little doubt that this tract is capable of supporting at least another million acres of jute without unduly straining the proportions between jute and other crops. The lack of population in much of the greater part of Assam, is however an almost insuperable bar in the way of any rapid extension and, although numbers of Bengalees from the crowded southern districts are beginning to emigrate to Assam, it would appear that by nothing short of a wholesale colonisation scheme can progress be made otherwise than very slowly.

(16) *Possibilities of extension in Bihar*:—In Bihar, Purneah is a very large jute producing centre but Cuttack is the only other district which grows more than 10,000 acres of jute. High prices in the years 1905-06 caused about 10,000 acres of jute to be grown, in 1907-08, in the districts of Muzaffarpur and Champaran, but the area fell again later partly owing to lower prices and partly to lack of market facilities. Since then jute cultivation has again shewn a tendency to increase but not to the extent which these areas are capable of supporting it. There are large areas in North Bhagalpur, and probably also along the Terai in North Darbhanga, where the production of jute could almost certainly be made profitable. The edges of the numerous "chars" or depressions in Tirhoot, where sowing could take place early in the year—in February—are capable of growing very fine crops of *C. Capsularis*. The fact such land goes under water in the rainy season to the depth of several feet has its parallel over large areas of the greatest jute growing tracts in Bengal. It is not even necessary that a pure crop of jute should be grown; a common custom in portions of the Dacca district is to broad-cast rice and jute together, the value of the respective yields being from one-third to half for the jute and from one-half to two-thirds for the rice. Thus, while a food crop is assured the monetary return is almost uniformly better than that from a pure rice crop. Such a practice is worth trying in Bihar. Another point worthy of investigation is how far *C. Olitorius* could be grown on the higher lands: the desi jute in districts near Calcutta is not often, on account of scanty rainfall, sown until late in May, or even the beginning of June. Such conditions approximate quite reasonably closely to those of Bihar, and I know that the production of successful crops of *C. Olitorius* in good high lands there to be more than a possibility. In most parts of Bihar cheap water communication with Calcutta is a very great advantage to start with.

(17) *Cultivation of substitutes in tracts not suited for jute*.

Hibiscus Cannabinus:—Outside the abovementioned tracts it is doubtful if, under present circumstances, jute could be profitably cultivated on a large scale but the question of jute substitutes is one which is of considerable interest in this connection. There would be no object of course in introducing such a substitute into Bengal which is the home of jute; but there are plants, whose fibre approximates closely to that of jute, which are capable of thriving under conditions, which would be quite unsuitable for jute. Of these, *Hibiscus Cannabinus* (Bimlipatam jute), which is to be met with in cultivation in nearly every part of India, is the most promising. Its fibre, as I have said, is similar in many respects to jute although, naturally enough, it is not looked on with favour in Calcutta. It has, nevertheless, especially certain varieties of it, a stronger, and probably a more durable, fibre than jute and, for this reason alone, if for no other, its cultivation is worthy of encouragement. It is produced on a considerable scale in Madras where there is a fluctuating area of between 50,000 and 80,000 acres in the East Coast districts. A gunny mill whose annual consumption is said to be about 25,000 bales has existed for many years at Bimlipatam and it was proposed to erect another one at Ellore in the Kistna district. It is worth noting that *Hibiscus Cannabinus* is also cultivated throughout Bombay and especially in Bihar and the United Provinces, so that a comparatively small percentage increase, over such a large area, would have a very considerable effect on the aggregate supply of fibres of the jute class.

(18) *Wide possibilities of Hibiscus Cannabinus*:—During the last ten years I have consistently advocated the merits of *Hibiscus Cannabinus* fibre as an acceptable substitute for jute and it seems advisable to recall the actual facts:—

A considerable shortage in the supply of jute in the period 1904-06 had led to high prices and a very large amount of fraudulent watering, in consequence of which Government was faced with a demand for penal legislation. It was wisely decided that the adjustment of the discrepancy between supply and demand by the production of large quantities of fibre of the jute class was the real remedy, and the efforts in regard to the improvement of jute in Bengal are one result of this policy; but in view of the profit to be obtained from the cultivation of fibres, it was considered advisable to investigate the possibilities of other parts of India in this respect. In 1905 at the instance of Mr. F. G. Sly, I.C.S., then Inspector-General of Agriculture, I made an extensive tour through India with this object in view, and an account of the tour was published in bulletin No. 3 (1906) of the Agricultural Research Institute, Pusa.

The recognition of the possibilities of *Hibiscus Cannabinus* as a substitute for jute was one of the most important results of this investigation, as the following quotations show:—
"..... it (*Hibiscus*) possesses the properties which render it a reasonably efficient substitute

for jute. It can be grown with success under the conditions of soil and climate which obtain in most parts of India and consequently is capable of much greater extension than jute, which requires, it would appear, more favourable conditions of soil-moisture for its development." In Madras, "..... it is capable of being produced in such a scale as to afford considerable relief to the present position of the jute trade."

"But it is not only in Madras that Bimlipatam jute can be successfully grown as a pure crop. It is common throughout Bengal, Bihar, Bombay and the United Provinces as a mixed crop and as the figures already quoted show that the cultivation as a pure crop returns a good profit—better than most other field crops—there is no reason why there should not be an almost unlimited supply of its fibre."

(19) *Selected seed of Hibiscus Cannabinus available*:—In Madras, where Hibiscus is grown as a pure crop, there are two or three types of which a straight growing red variety called *Yerra Gogu* is considered by cultivators to be—and is in reality—much the best as a fibre producer. An investigation of these races of Hibiscus was originally undertaken about 1905 in collaboration with Dr. Barber, Government Botanist, Madras, but ultimately the seed samples were handed over to Mr. Howard of Pusa, who has produced pure cultures and investigated the conditions under which the crop must be grown to avoid contamination by chance crossing. The department is thus practically ready to supply pure seed of the best kinds of Hibiscus in quantity to the cultivator.

(20) *Bimlipatam jute in European markets*:—It is important to observe that spinners in Europe who are in the habit of using Bimlipatam jute speak well of it.

There is a considerable export of the surplus Hibiscus fibre under various names such as Bimlipatam jute, etc., from Madras to London and Dundee, where it is a recognized item in the jute market, and where it is bought for purposes for which jute would otherwise be required. The buyer of jute is thus relieved of a corresponding amount of competition. It is worth remembering that in this case also it is by no means necessary to grow a pure crop of Hibiscus Cannabinus; indeed, excepting in Vizagapatam, parts of Eastern Bengal and in the Purnea district, it is more commonly mixed with food crops.

(21) *Further experimental investigation necessary*:—There are thus considerable possibilities for the production of jute, or of fibres similar to it, in parts of India outside Bengal, or the portions of Bihar and Assam, where jute cultivation is already carried out on a large scale. No one will deny that jute has brought great riches to this latter tract; but there are indications that it is approaching its limits. In view of this I suggest that the investigation commenced in 1905-06 be re-opened to determine finally the possibilities of other parts of India, and especially Bihar and the United Provinces, as regards the cultivation either of jute or of similar fibres. It is possible that while the War lasts the demand for jute will not be so great as it was before hostilities commenced: moreover there may be a considerable period of trade depression after peace is declared; but ultimately we are bound to see a recrudescence of the demand for sacking fibres, and I submit that the interval is a favourable time in India for establishing a policy in this on a basis of experimental results.

(22) *Artificial substitutes for jute*:—It is certain that artificial fibre is already being used to some extent by Germany for sacking; and complete shutting off of supplies of jute has rendered the production of artificial fibre on a large scale a necessity. The progress in the manufacture of artificial fibre is not however confined to Germany; for there are now several factories in America which are engaged in making all classes of goods, from carpets to sacking and twine. There are also mills in England, one of which is using a waterproofing process, which overcomes the tendency of paper textiles to disintegrate when wetted. It is not contended that these goods are superior in all respects to those made of jute: indeed it is pointed out as a disadvantage, that they are generally considerably heavier. On the other hand they have superior strength and, most important of all, they can already be produced more cheaply than jute at anything like its present price: further, though it is not at present contended, outside Germany, that they are intended to compete with jute, there can be little doubt that they will become more and more capable of doing so as methods of manufacture become more perfect.

(23) *Competition of artificial substitutes to be borne by grower*:—It is impossible at present to say definitely whether or not artificial fibre is likely to be a serious competitor of jute; but it may be too late if we wait until we have the answer to the question, and the obvious sound policy is to take due precautions. Undoubtedly the best protection against such a menace is an enhanced production of natural fibre; so that prices, while ensuring a good profit to the grower will not soar to fabulous heights, as is the case at present. The danger is rather to the cultivator than to the manufacturer; for if it paid him to do so, the latter would adjust his machinery to work on the new product and the whole of the competition would ultimately fall on the grower of jute, just as it did on the indigo planter.

(24) *Interests of cultivator and manufacturer identical*:—The cultivator has therefore at least as much interest as the manufacturer in seeing a better balance between supply and demand than there is at present in the case of raw jute; for even though he might then receive rather less for the fibre he produces, he could look forward with certainty to an undisturbed permanency of moderate profits.

In this connection the following quotations from a note written in November 1913 by the Chairman of the Indian Jute Mills Association is *apropos* :—

“Jute, raw and manufactured, now occupies the first place in the export trade of Bengal. During the past year, 1912-13, it represented over 50 per cent. of the foreign export trade of Calcutta, as follows :—

	Rs.
Jute, raw	24,46,99,531
Jute, manufactured	22,76,62,513
	47,23,62,044
to which must be added :—	
(1) Jute, raw, exported from Chittagong	2,48,18,000
(2) Jute, manufactured, exported to Indian coast ports	2,74,00,000
(3) Exports by rail and river, tons 99,500 valued at say	3,98,00,000
TOTAL	56,43,80,044

“This year the value of the jute trade to Bengal will be still greater and surely it is not too much to ask that Government should take a more active interest in the cultivation and extension of a crop which directly or indirectly brings into the province from 50 to 60 crores of rupees annually.

“It would be nothing short of a national disaster if India and Bengal in particular were to lose the jute trade.

“The decline in the Bengal silk trade is said to have been due to the prevalence of silk-worm epidemics or to some other causes outside Government control. There is little risk of insect pests being made the excuse for any decline in the jute trade and so long as jute provides the cheapest material for packing and wrapping purposes there is little likelihood of any interference with India's monopoly of the trade in this raw material. But if prices of jute, both raw and manufactured, are to remain at present high levels no efforts will be spared to provide substitutes or to discover other means of handling the produce of the world.

“Already elevators, wagons and steam vessels are being constructed all over the world for the handling of grain in bulk. The crops in Canada are nearly all brought to market by this means. On the West Coast of North America efforts are being made to introduce the same system. In Australia Government's sanction has been given to the expenditure of large sums of money for the like purpose and even in India elevators are being erected for the storage of wheat.

“It is bad enough to find outlets for jute manufacturers being closed in this fashion but worse still is the knowledge that substitutes for raw jute are actually being discovered. The following extract from the Dundee Trade Report, dated 3rd September 1913, explains the position :—

Textilose versus jute.—It would appear as if textilose were making progress in the different countries. It is stated to us that the price of paper yarn is little more than one half of the price of jute yarn at present high prices.

The textilose business is in the hands of a French Syndicate. We are informed that a new Association is being founded with a capital of 23,000,000 francs to establish the production of textilose in different countries. Apparently the right to manufacture is sold for a sum of ready money, and in some cases an interest is acquired in the different undertakings by the ruling syndicate, while royalties are also paid according to production or the guaranteed quantity.

Textilose yarn is a mixture of paper and cotton waste which is believed to be infinitely superior to all paper yarn. Fabrics made of textilose warp and jute weft are also greatly superior to the fabric manufactured from purely textilose yarn. This industry is in its infancy, whatever may become of it.

France.—At Rethel there is a small factory of 80 looms capable, however, of considerable development but there is great scarcity of workers. Production seems to be easily disposed of.

The jute mills have offered a sum of money in order that they shall not be competed with.

Germany.—There are two mills exclusively for textilose and one under construction. There is a mill at Adorf and another at Oppeln, and a third going up in west Germany. They have not come to an agreement with the jute mills in Germany.

Austria.—At Fleissen a mill was put down, which was bought up by the jute syndicate. The Austrian Jute Syndicate have undertaken the production of textilose, and have bound themselves to produce a large quantity per annum. There is an Association in Austria and also in Hungary, each with a capital of 5,000,000 Austrian kronen.

Italy.—The rights have been acquired by that country, in which venture the Syndicate also has an interest.

Spain.—There also is a company. They are setting up a mill to make paper yarn for themselves.

Brazil.—Textilose has also been taken up in Brazil and the patent right purchased.

North America.—A company has been formed and the necessary arrangements concluded with the Syndicate.

England.—Textilose is also of course in operation in England. There is a company in Manchester.

“India already has had a costly experience of the result of cheap and efficient substitutes being found for the natural article. Less than 20 years ago India had 1,688,042 acres under indigo producing 237,494 cwts. Now only 214,500 acres are under cultivation producing 37,600 cwts. only.

“Can the Government of India and the Government of Bengal afford to look on idly and watch jute follow indigo?”

“Scarcity of milling plant and absence of local demand for manufacturing purposes may be sufficient reasons for Government not giving more encouragement to the cultivation of sugarcane. The prevalence of silkworm epidemics may be the cause of the steady decline in the silk industry. The introduction of cheap aniline dyes is no doubt the explanation of the decayed condition of the indigo trade. But so far as can be ascertained there is no excuse for the “laissez faire” policy adopted by Government to agriculture in general and jute in particular. There are already mills in Bengal consuming more than half the total crop of jute. Capital, machinery and labour are and will be forthcoming to consume all the raw material that Bengal can supply. Last year jute mills’ machinery to the value of Rs. 86,36,021 was imported from Britain into Calcutta for new mills and extensions of existing premises, and imports for the current year are also very heavy, as more new mills and extensions are still under construction. Surely it is up to the Government of India and to the Government of Bengal to spare no efforts for the encouragement of jute cultivation.”

(25) *Artificial retting*:—There is another aspect in regard to jute which is assuming increasing importance. In the early eighties the question of jute production in the Southern State of America received thorough attention from the Government Agricultural Department. Good crops were grown; but the retting proved so serious an economic stumbling block as to put success out of reach. One of the conclusions drawn by the officers in charge of the experiments was that, while the ordinary methods of retting and stripping rendered jute production impossible in the Southern States, the position would be completely changed by the advent of a successful artificial process of extraction. Since that time trials with jute in otherwise suitable tracts in various parts of the world have failed uniformly over retting and stripping. Numerous patents have been taken out; but hitherto none has come into use. *Witness here gave confidential evidence.*

(26) *Necessity for broad policy based on experimental investigation*:—Nevertheless it must not be forgotten that the advent of artificially extracted jut fibre, which appears to be imminent, will certainly, as already pointed out, help the ceaseless efforts which have been, and are still being, made to grow jute in other parts of the world. Thus we are again faced, from another aspect, with the necessity of broadening our policy in regard to the production of fibres of the jute class in India. Such a policy can only rest on an experimental basis, and it is most advisable that the necessary results should be obtained as soon as possible. The cultivation of jute has been of great financial benefit to the Bengal raiyat and its extension into other tracts, or the increased cultivation of similar fibre crops, is not likely to be less beneficial to the inhabitants of these tracts. On this account we should be prepared beforehand with the experimental data, so as to be able to grasp the opportunity when it comes.

(27) *Effect of artificial extraction in helping increased cultivation of sann hemp*:—Wholly, or partial, artificial extraction would also greatly help towards an increased production of valuable fibres like sann hemp (*Crotalaria Juncea*) in the Central Provinces and in the Punjab. In both these tracts the lack of retting facilities, as well as of labour required for stripping, not only severely limits the amount of fibre produced, but is the principal cause of its inferior quality, which has been the subject of so much adverse comment in recent years.

(28) *Sann hemp (Crotalaria Juncea) in Bengal*:—Compared with jute the importance of any other fibre in Bengal is small; the total of “other fibres” than jute in Bengal is only about 30,000 acres nearly all of which is sann hemp, and the main object of much of this is to make use of the fertilizing action of the sann hemp plant for the subsequent jute crop. From this it will be gathered that sann hemp in Bengal is largely a cold weather crop, it is only in parts of Western Bengal, such as Rajshahi, that it is to be found as in the rainy season. Practically the whole of the cold weather sann hemp cultivation is carried out in the Pabna district where there is a regular trade in its fibre. The only other districts where a perceptible amount is to be found are Chittagong and Mymensing. In the former the object is fibre production; but in Mymensingh the crop is largely fed off by cattle as a preliminary to jute cultivation.

There is no large scope for an increase in sann hemp cultivation in East Bengal. The conditions are not suited for it in the rains, and in the cold weather ample soil moisture for the production of sufficient length, and convenient water for retting, are necessary. Outside Pabna perhaps these conditions might be realized in parts of Faridpur, Noakhali and Bakherganj, but it is not likely that any such extension could ever assume first class importance. On the other hand it is quite possible that a considerable development of monsoon sann hemp cultivation might take place with advantage in those parts of West Bengal where jute would be a precarious crop. The yield of sann is less than that of jute, but its price is higher and has been steadily rising for the last six years. Under these circumstances and considering its fertilizing action on the soil it is quite possible that it might prove a more satisfactory field crop than jute.

(29) *Hibiscus Cannabinus*:—This plant is only cultivated to a small extent in Bengal. It is cultivated under practically the same conditions as *Corchorus Olitorius* and as the latter yields a heavier crop of fibre there is no object in attempting to exploit *Hibiscus Cannabinus* as a substitute in Bengal. *Hibiscus Cannabinus* is however capable of growing satisfactorily on a less rainfall than would suit *Corchorus Olitorius* and for this reason it has claim to serious consideration if means of increasing the production of fibres of the jute class outside Bengal are to be investigated. It is widely cultivated throughout India and in Vizagapatam it is one of the staple monsoon crops. Elsewhere it is chiefly grown to provide home made ropes, but a considerably larger area is almost certainly possible. Its fibre is a well known and recognised item in London and Dundee where it is used for purposes for which jute would otherwise be required and although it is not looked on with favour in Calcutta it would seem nevertheless that it is capable, if necessary, of relieving pressure on the jute to a very considerable extent. The possibilities of this crop as a substitute for jute have already been discussed.

(30) *Flax; Linum Usitatissimum*:—The cultivation of linseed as a grain crop is common in all parts of Northern India; but it is never grown for fibre. Although botanically identical, the cultural differences between Indian linseed and European flax are considerable. The stem of the former is short, often very branched, woody, contains very little fibre of brittle nature and the plant produces a large amount of seed; the latter is a much more delicate plant growing as a single straight stem, which in the best varieties is hollow like a corn stalk, containing very little wood and a comparatively large portion of fibre. Each plant has in fact been specially selected for the purpose for which it is cultivated. It follows that the Indian linseed is entirely unsuitable for the production of fibre.

Experimental cultivation of flax:—Numerous attempts have been made to introduce the cultivation of European flax for fibre into India, but none has yet succeeded in establishing it as a staple crop in any tract. The most recent, as well as the most systematic, trials took place in Bihar between 1908 and 1913 under the joint auspices of the Government of India and the Bihar Planter's Association. These trials showed that excellent flax can be grown in Bihar and that a reasonable profit can also be obtained. The cultivation of the crop however needs special care and the extraction of the fibre is an intricate process which needs expert supervision.

In the United Provinces, on Government farms and with irrigation, even better results have been obtained than in Bihar and attempts have been made to induce cultivators to grow the crop; it is too early yet to say whether these attempts will succeed, but it is fairly certain that central retteries will have to be established if the best quality of fibre, and consequently the best monetary return, is to be realized. Very good flax has also been grown in Assam but nothing can yet be said as to its ultimate prospects and the same may be said of Kashmir.

The crop grows well in Northern Bengal but it remains to be proved whether there is room in this province for flax, as well as jute.

Co-operative retteries:—It would appear in the case of flax, as with other crops which require mechanical treatment, that if a sufficient number of cultivators take it up, each on a small scale, their united produce would suffice to keep a central factory working. The factory might be a co-operative one controlled by the cultivators or, it might be a separate enterprise.

(31) *Sisal (Agave Sisalana)*:—Sisal is one of numerous members of the Agave family whose exploitation has been proposed in India. In other parts of the world, viz., Mexico, the Bahamas, and specially in East Africa, German and British, sisal cultivation is a thriving industry. The Indian experiments seem to have been commenced under a wrong impression, viz., that sisal thrives in poor soil better than in good land. In East Africa the plantations are on rich soil of volcanic origin; moreover they have the advantage of two rainy seasons in the year. Sisal planters in India also began at an unfortunate time, just before the beginning of a period when prices fell to an artificially low level. It would seem that at £20 per ton there is little profit to be made; but in the last five years, even before the War, prices have been decidedly above this level and well established concerns have made money, especially since the War began.

So far, sisal, like flax has only been a capitalist's crop but as in the case of rhea there seems no reason why a cultivator should not grow a few plants: there are quite simple implements capable of producing good fibre, which would always have a ready sale.

(32) *Rhea Boehmeria Sp.*:—The position regarding rhea is described in detail in Mr. Coventry's article and in my review of Mr. Carter's book. Rhea cultivation is very rare in

India, being apparently confined to Assam and Northern Bengal. In Northern Bengal it is only grown by low caste cultivators for use in the making of fishing nets and the plots are always very small—1-20 acre or less. Extraordinary amounts of manure are applied—far more than would be possible on a large scale and very careful drainage is also provided. The fibre which is extracted by simple manual treatment is very like “China grass”. Under present circumstances it is not in the least likely that rhea will be cultivated in India for export: on the other hand, if the growing of the plant as well as the degumming and spinning operations were in the same hands the higher price to be obtained for the filasse might offer sufficient inducement for an extension of cultivation.

(33) *Cocoanuts*.—Cocoanut cultivation is a considerable and increasing industry in the coast districts at the head of the Bay of Bengal and the following are approximate statistics for the number of trees in the respective districts.

	Approximate number of cocoanut trees.	Average number of fruits borne per tree per annum.
Noakhali	660,000	} Between 30 and 50.
Tipperah	259,000	
Backerganj	2,731,000	
Faridpur	15,000	
Khulna	1,659,000	
Jessore	562,000	
Nadia	521,000	
24-Perganas	2,840,000	
Howrah	803,000	
	10,050,000	

There were thus, at the time the census was taken over ten millions of cocoanut trees in the districts at the head of the bay. These figures are some years old and it is said that there has been a marked increase in recent years. It is estimated that there were between 50 and 60 millions of trees in Ceylon at the same date. At present practically all the Bengal nuts are exported whole, *i.e.*, in the husk; in some places it is said there is a small oil crushing industry; but the number of nuts affected is very small. In no case is there any mention of use being made of the coir, or husk fibre, which is such an important industry in South India, and I suggest that this is a matter which is worthy of investigation. At present there are practically no data and it has even to be determined if the coir would bring such a price as would induce the Bengal cultivator to take up its extraction; for it has to be remembered that the cost of labour in Bengal is greater than in Southern India. Information from the Government Botanist, Madras, is to the effect that about 3,000 husks yield one kandy (720 lbs.) of fibre which costs about Rs. 35 to produce and sells usually for from Rs. 40 to 50.

There are a number of varieties of cocoanut of which Moon (1824) enumerates eight, with 16 sub-varieties, and it remains to be seen if the common tree in Bengal is the most suitable for fibre production.

Lastly the cocoanut trees in Bengal, though usually on land surrounding villages, are not to be found in large groves, such as is the case in Madras and Southern India.

It is thus impossible to make any definite statement regarding cocoanuts; but there is obviously sufficient reason for an investigation which will yield definite information.

ORAL EVIDENCE, 8TH DECEMBER 1916.

President.—Q. Are you a regular officer of the Agricultural Department, or are you just a temporary officer?—A. A regular officer.

Q. How long have you been out?—A. I came out in 1903.

Q. You have had quite a long experience?—A. I think I am one of the oldest members of the Agricultural Department.

Q. Considering some of the general propositions here, apart from the questions in your special line, you suggest the enlargement and broadening of the Board of Scientific Advice to act in India as an institution corresponding to the Advisory Council for Research in England. The system adopted there is a little different to that which you propose for India. They have a small Council and under that small Council a series of specialised Committees. The special Committees include a certain number of commercial men who are interested in the application of scientific and technical research. In that way they think they are getting a closer discussion of problems that are before them, and they are also preventing the discussion of problems in science by a large number of men who are not interested in any particular problems. They save time in that way, and can also get together these Committees more readily than they could a large body such as would be necessary to cover all forms of scientific knowledge. What applies at home in the last respect applies also to India where distances are great and it would be difficult to get together; for instance in the Punjab there are only two or three men to attend frequently meetings of a Board of that kind. Do you think that the scheme adopted in England is more appropriate for India, or the scheme you suggest?—A. My idea was that of a Committee, I did not state it in so many words. My idea was a series of Committees for special subjects.

Q. The Board of Scientific Advice might still be enlarged to a certain extent to cover the big groups of subjects. I am not prepared to offer any opinion on that point, but you would not like it enlarged so as to include all the necessary scientific men together with business men who would be interested in turning these researches to commercial account?—A. I think I have suggested something in these words, *viz.*, a nucleus of permanent members, and that the members of the various Committees might be co-opted as circumstances might require. Your description of the Board at home agrees practically with my ideas on the subject. I don't think it would be possible to have a big Board to discuss everything, on account of the distance alone.

Q. In your study of the question of fibres in India, do you require yourself anything like botanical knowledge, or would it be sufficient to refer your purely botanical problems to an appropriate department?—A. My work has not involved much purely botanical work, but where the latter has been necessary, I have usually collaborated with a botanist.

Q. I have been told that cases of this kind occur, where a botanist would determine species of plant in the ordinary way, but would not be able to distinguish between the varieties until they were actually grown, and that in some cases a variety may be a valuable plant, from the point of view of yielding fibre, whilst another variety may be entirely worthless?—A. That is quite true; there are only two botanical varieties of jute.

Mr. C. E. Low.—Q. Cultivated jute?—A. Yes, but each variety of jute comprises a large number of races which differ considerably in their respective fibre yielding capacities.

President.—Q. Do you think that the work in connection with fibres generally in India would be sufficient to occupy anything like, say, half a dozen technical specialists for a fairly unlimited number of years in research work, and in encouraging the development of these industries?—A. I think, to begin with, you would have to establish that there is a case. Of course in Bengal the jute industry is a very big one, but outside that, as far as the jute class of fibre is concerned, it is not a very big thing. You will have to prove first of all that there are possibilities before you engage a very large staff.

Q. To prove a negative case you would require a good deal of time for one fibre expert?—A. I mean in making experiments to see whether for instance the cultivation of jute in a particular tract would be a paying proposition. That would not take very long.

Q. And even to condemn other fibres as more or less worthless would take a fair time?—A. Oh, yes, it would probably take two or three years.

Q. Do you think that the question of dealing with fibre-producing plants is in itself a speciality, in the sense that it is better to have one expert, or at any rate a group of experts specialised in fibres, or a number of men; for instance, for your specialisation, to adopt the line of having one taking an interest in jute and another in flax, and a third in cotton, and so on?—A. I should separate the cotton from the others.

Q. Because it is so purely agricultural, and its fibrous qualities are already dealt with?—A. It is a different class of fibre from others; flax and jute are fairly closely allied in the sense that both are stem fibres and that similar methods are used in their extraction.

Q. When you take jute and sann hemp and Hibiscus Cannabinus and cocoanut fibre, you will have enough problems to occupy more than one man?—A. Certainly, eventually, but with the exception of jute and sann hemp and a certain amount of Hibiscus in Madras, there is not very much at present. For instance, there is practically no flax grown for fibre in India. Experiments have been made to prove that it can be made to pay in Bihar and some experiments have also been made in the United Provinces, where they are trying to give the flax out to cultivators to produce. One cannot say, however, that there is production to any extent.

Q. You have not exactly got on to the point that I have been trying to develop. I notice you have dealt largely with the cultivation of jute; the conditions under which it is grown. You have dealt largely with the agricultural aspect of the jute question. I want to know whether there is such a thing as a fibre expert who is not necessarily conversant and would not be conversant with the agricultural cultivation of the plant giving rise to fibre?—A. I think the fibre expert ought to have the agricultural knowledge.

Q. Work from the agricultural side?—A. I think that ought to be included in his work.

Q. Judging of the value of the fibre, its qualities, etc., who would do that for you; if, for instance, you were replaced by an ordinary agriculturalist or an agricultural chemist without special experience in fibres would that be easily done by an ordinary agriculturalist?—A. You mean the commercial valuations? If I want commercial opinion on fibre, I ask a man who is in the trade, usually someone in Calcutta. There are some fibres that are not used in Calcutta. The Calcutta man would say that this kind of fibre is not in much use in Calcutta, and he would only give a nominal value for it. In this case I would send it elsewhere.

Q. In that case you would not get a favourable opinion unless it was a good fibre-producing plant?—A. Probably not; they say they have no use for it.

Q. You have no means of developing the plant up to standard; or can it be brought up to standard by improved agriculture?—A. From commercial opinion and one's own knowledge, one would be able to judge of its possibilities and decide whether or not it would be worth while continuing work on it.

Q. Have you got any laboratory methods of obtaining preliminary values with regard to fibre, the same as one does with reference to minerals, without getting actual commercial valuations?—*A.* One can distinguish comparatively easily between different fibres.

Q. And to that extent any ordinary technical man ought to make generally an expert?—*A.* I think certainly a fibre expert should have technical knowledge in addition to his agricultural knowledge, otherwise he would be working in the dark a good deal. I am myself a chemist by profession.

Q. I am thinking what would happen to the whole of this institution if anything happened to you. We heard of a case this morning of a good officer who had been transferred from a promising series of experiments to relieve another one in a different province; the whole of his work absolutely collapsed?—*A.* Yes, that is temporarily true in the case of Mr. Annett.

Q. It would be equally true if you were transferred to another work?—*A.* Yes, the other man would have to begin more or less as I began. But my work on jute has gone so far now that it is gradually passing out of my hands into those of the Deputy Directors and their district staffs. The seed is going out in large quantities and will continue to do so in increasing quantities and I anticipate that the time will soon arrive when my control over the jute work in Bengal will become largely mechanical, *viz.*, to ensure the constant flowing out of a supply of pure seed for multiplication on a large scale by the seed producers.

Q. Still there is no such thing as an industry standing still. As soon as the fibre becomes established, somebody sets up an opposition to fibre, and unless it goes ahead, it will soon find itself knocked out?—*A.* I would be glad to have another man working on the same lines as myself; in fact we are about to make proposals to that effect.

Q. What is your idea as to how that man should be employed; would he come in as a normal member of the Agricultural Department?—*A.* Yes, a man in the junior grade who will work up to that. That is our idea at present.

Q. He would go into a blind alley as a fibre expert, never rising to anything above what the Government consider worth while to pay for a fibre expert?—*A.* He would be on the ordinary service grade, I presume, which would be the same as for a chemist or a botanist.

Witness subsequently forwarded the following note relating to this question.

The question seems to raise a point regarding the advisability of delegating an officer to devote the whole, or practically the whole, of his time, for as long a period as may be necessary, to making a special study of a particular crop or class of crops. There is a distinct tendency in this direction, not only in the Indian agricultural service, but also, for instance, in the American Department of Agriculture and the policy has, in the case of the Indian department at any rate, been justified by results.

It would be unfortunate if the impression should gain ground that, even if his investigations lead to successful results, the prospects of an officer are likely to suffer by his becoming a specialist in this sense. His technical knowledge as a chemist, botanist or agriculturist is continually employed and developed during his investigations and, at the conclusion of the latter, the presumption is that his experience will make him a more valuable member of his profession than before their commencement. The difficulty seems to be at least partly a question of nomenclature; if so, this should be remedied and, in any case, the matter should be thoroughly discussed, if only to avoid disappointment and its inevitable reaction on the work of an officer employed as I have described.

Mr. C. E. Low.—*Q.* You give an account of improved jute seed which you are getting out: where is that produced?—*A.* At present we are producing it in Bihar and Assam.

Q. Or whose lands are you producing it?—*A.* In Bihar; Pusa is growing a certain amount, and also the planters.

Q. Is that an agency which you think can be expanded sufficiently to serve any appreciable portion of the jute areas in Bengal?—*A.* I think so. One acre of jute in Bihar, I think, would produce somewhere between 7 and 10 maunds per acre of seed. We cannot hope to affect the whole of the jute-growing area in a single year, but what we are doing is to grow this seed and then to distribute it or sell it, giving preference to those tracts where cultivators are in the habit of producing seed for sale. The reason why we are attempting to produce seed outside the province of Bengal is that, first of all, a crop of seed is not as valuable as a crop of fibre; I mean to say, taking the ordinary crop of jute as 15 maunds of fibre, that is roughly Rs. 150 an acre. A crop of seed jute in Bengal is very much less than it would be in Bihar. A crop of seed jute in Eastern Bengal would average something like 3 maunds of seed per acre, probably never more than 5 maunds. That at Rs. 8 per maund would be Rs. 40 at the outside.

Q. Do cultivators in Bengal show any signs of being ready to pay high prices for this superior seed?—*A.* Yes, I think so. As a matter of fact we can deliver the seed in these places at prices which are perhaps lower than the average, much lower than the price of seed in some places, and rather higher than in others, but on the whole below the average market price.

Q. Does it pay planters in Bihar to grow jute seed?—*A.* Yes,

Q. How do you enable the seed-growing cultivator in Bengal to get hold of this jute seed?—A. We are just commencing to organise. The Director of Agriculture proposes to work through the panchayats. This year, for next season, we are distributing a certain amount of seed to each panchayat on the condition that the crop is not cut for fibre but that the whole of the produce remains for seed, which will be sown in the next year. The quantity of jute seed distributed to individuals has been adjusted so that, if the above is done, the cultivator to whom seed has been given will, on an average, have sufficient seed to sow the whole of his jute area next year. If entirely successful the scheme will result next year (1918) in about 30,000 acres being sown with improved jute seed in the Dacca district alone. At a moderate estimate this would entail an increased yield of 60,000 maunds of jute fibre.

Q. Is there much cross fertilisation in jute?—A. No; practically none.

Q. Do you get cases of people growing mixtures of local and improved seed?—A. I have not yet had sufficient experience of this phase of the work to say, but it is highly probable. We anticipate it. If the cultivators begin to grow our jute in a seed-producing district the supply of seed from that district must be mixed for the first few years. Ultimately, however, because of its superior qualities, the improved jute will completely replace the local one.

Q. Does the value of your seed depend on its being pure, or is it only a question of greater outturn?—A. At present it is only a question of greater outturn. There is not a sufficient difference between the quality of the fibre of one kind of jute and another to make the respective prices differ much.

Q. The mixture will be injurious only in arithmetical proportion?—A. Yes.

Q. You do not find, as a matter of practice, that jute is extending into any other of the provinces where it had not been grown largely before? Is the growth materially extending?—A. There is no jute outside Bengal, Bihar and Assam at present. There were certain experiments made in Madras, the Central Provinces and other provinces about ten years ago, but they were not continued for very long.

Q. Practically in areas outside Bengal you have got to get to you nearly sowings by means of irrigation, and if it is a question of storage it is too expensive?—A. Yes, I think so. I am not at all sure that outside Bengal, Bihar and Assam, it would be possible to grow jute. I am inclined to think it could not be done except by irrigation. In a tract like the Punjab colonies, where it is possible to get water in time to sow the crops, it is really a question of a sufficiency of labour and of retting water.

Q. I understand that jute in some places is followed by a rice crop almost immediately?—A. Yes, that is a very wide practice in Bengal.

Q. Then that can be done especially in Dacca and Mymensingh?—A. Mymensingh very especially; in all tracts which are not too low for it. There are different types of land which grow jute. Some never go under water; others are typical rice lands where they grow a crop of jute or *Aus* paddy first.

Q. The extension of jute in some areas would not diminish the outturn of food crops?—A. It should not interfere with transplanted paddy in a district like Mymensingh, but it would certainly extend at the expense of (broad cast) paddy, which would be replaced either on high lands or where it is grown in rotation with transplanted paddy.

Q. The jute crop is usually a heavier crop than the rice crop?—A. Yes, but there is one point about that. Take the case of a single cultivator. It is possible he grows more jute than he should. The extraction of the jute fibre comes just at the same time as he would be transplanting his paddy and if he has too much jute to extract, he has to restrict the amount of paddy. That is rather indicated by the statistics.

Q. You speak of Hibiscus as fulfilling much the same purpose as jute?—A. Yes.

Q. Of course it is grown no doubt in small quantities in many parts of India; but how about the difficulty of retting it?—A. The cultivation of Hibiscus would have to take place where retting water is available; but this is the case in many places when the rainfall, either in amount or its distribution, is unsuitable for jute. For instance, starting with Western Bihar and the eastern part of the United Provinces; perhaps also in some parts of the Central Provinces: in the rains there would be a considerable amount of water in these tracts, but the rain would not come early enough to allow of the sowing of jute.

Q. What time would the Hibiscus be required to be retted?—A. In August and September. The reason why one would grow Hibiscus instead of jute in the tracts just mentioned would be that Hibiscus would be sown so much later. It is necessary to sow jute earlier than the Hibiscus to get a normal crop.

Q. Taking the case of wild plants with fibre-producing potentialities, which are under cultivation; suppose you got hold of a variety of them; don't you think that it is rather risky taking a wild plant and growing it under cultivation?—A. I don't think so. I think one of the varieties of jute is supposed to be a native of India.

Q. That has probably been evolved after a long course of selection?—A. I have an instance in Sida, a jungle fibre which I have been growing during the last ten years. I do not think it adversely affects other cultivated crops in any way.

Q. When you introduce your Sida on an economic scale, a considerable period will elapse before a market is established for it?—A. For Sida there is an immediate market.

Q. Locally?—A. Yes, and it would always sell in England. Probably it would go into finer material than could be made of jute. I have ascertained that there would be no difficulty in disposing of any quantity of Sida fibre in any European market.

Q. You would have cases where you would not be able to establish a local market until you produce in pretty considerable quantities?—A. Yes, perhaps.

Q. You might want some organisation for helping the growers of the crop through for a year or two, not only for fibre but for other things?—A. I don't think there would be the same difficulty in the case of a fibre like Sida.

Q. You don't think an organisation to purchase these things and get a market for them, for the first year or two, necessary?—A. In the Central Provinces, I think, you would need organisation for the disposal of large quantities of fibres of the jute class.

Q. Commercial agency or the Agricultural Department would have to give facilities? The Agricultural Department has done that kind of thing in the past, but it is not an Agricultural Department job. It entails a great deal of work of a commercial nature to men who are really experts?—A. Yes, that is true. The Agricultural Department could not hope to carry such a scheme beyond the experimental stage.

Q. When you take up a question like retting machinery, where do you think the functions of the fibre expert should end, and the functions of the industrial expert should begin?—A. I have not thought about it very much, but I should think the functions of a fibre expert employed by Government would probably end when the experimental stage is passed.

Q. You were talking of jute substitutes; do you think that paper pulp is likely to compete with jute on the point of price?—A. I think it all depends on the price of jute.

Q. Unless jute rises very considerably above the limit of the prices prevalent before the War, the cost of wood pulp is not likely to fall very much?—A. The tendency of wood pulp would, on the whole, be to go up but the prices of jute also were if anything higher by comparison for four years preceding the War.

Q. If it was not able to compete before the War, it is not likely to compete now?—A. I think that before the War these things were all more or less in an experimental stage. Germany and Austria were the two nations who really made serious attempts to produce artificial fibre, but they had hardly got beyond the stage of experiments before the War came on. I cannot be certain of the figures at all, but they say they can produce paper fibre at prices below £20 per ton.

Sir F. H. Stewart.—Q. Is cotton in your opinion likely to be a dangerous competitor to jute under any circumstances? Has it been so in America, up to date for instance?—A. There has always been a good market for cotton. The price of cotton, per ton, has always been higher than jute. I don't think cotton would be a very likely competitor.

Q. You don't know of any industry in which cotton has been used in America, as a substitute for jute?—A. I have heard of its being used for sacking and also for cordage, but I am fairly certain that it is not used on any large scale for the former purpose.

Q. Is there some particular form of sea-weed which might possibly be used as a substitute for jute?—A. I have not heard of any successful developments though I have seen optimistic paragraphs in the daily press in regard to the possibilities of marine weeds in this direction. It has been proposed to extract fibre from water Hyacinth (*Eichornia Crassipes*) for the manufacture of gunnies.

Q. Is there any sign of increased cultivation of jute in Assam?—A. It is entirely a question of population.

Q. There is nothing particular being done there now?—A. Very little increase is taking place in the area of jute. Bengali emigrants go from Mymensingh to Nowgong. In the last five years there have been about a thousand men per year, and they grow jute.

Q. What is being grown there at present on land suitable for jute?—A. It is practically all paddy with some sugarcane, but the proportion of land which is capable of cultivation and has not been cultivated approaches 75 per cent. of the whole country.

Sir D. J. Tata.—Q. What are the conditions under which jute is grown here? Why can it not be grown in other parts?—A. The difference between North-Eastern India and Western India is one of rainfall. It is not only a question of the actual aggregate amount of rainfall, but of distribution.

Q. Why is not jute possible on the Bombay side, as well as here?—A. If you take the Konkan, you may have rainfall up to 200 inches, but practically the whole of that rainfall comes between the middle of June and the end of September, and it begins with a tremendous burst that would be impossible for jute. Jute must have a period of comparatively slight rainfall in its early stages. The land which grows paddy in Eastern Bengal is dry land, at the time jute is sown and often remains dry until the end of June. Even when jute is cultivated on land subject to inundation a large proportion of the growth of the crop takes place before the inundation.

Q. Can Hibiscus be grown on the Bombay side?—A. It could be grown on high lands which do not go under water.

Q. Does it require irrigation in any way?—A. If the rainfall is small, and especially if it is very late I should say 'yes'.

Q. Could you utilise, say, the tail-waters of large hydraulic works for growing this Hibiscus in any way?—A. Yes; if the water were available in the early part of the season.

Q. By the 'early part' you mean the cold weather?—A. From the end of February onwards.

Q. If water is available, you think this Hibiscus could be grown to advantage?—A. On the higher lands. It is a question of manure too, if your land is not good enough.

Q. The rainfall would not affect it? A heavy rainfall at the foot of the ghâts would not in any way harm the crop?—A. I don't think so, if you are able to give the crop a start with irrigation and if the land is not liable to inundation.

Dr. E. Hopkinson.—Q. I want to ask you about flax. Flax, you say, grows well in Northern Bengal, but has it been grown systematically?—A. There is no flax growing industry; flax cultivation in India is only in an experimental stage.

Q. Have any systematic experiments been made?—A. Not in Northern Bengal; in Assam they have produced quite good results. Last year I had quite a good crop of flax in Northern Bengal.

Q. What acreage?—A. Only small. There is no production of flax; it was only an experimental crop.

Q. You say, "it remains to be proved whether there is room in the province for flax as well as jute?"—A. The point in my mind when I wrote that was that if you grow jute and flax the two crops would probably exhaust the soil in the same way. They would not be able to grow the flax oftener than once in 4 or 5 years at least.

Q. Jute is grown once in three years?—A. It depends on the tract; in some parts it grows every year; in Rangpur about two years out of five.

Q. It would not be possible to grow jute and flax in rotation?—A. One might grow jute in one year in the rains, and then have flax as a cold weather crop another year.

Q. I suppose you cannot form any estimate as to whether jute or flax is the more valuable crop?—A. I think jute is very valuable. The yield of flax is so much less than that of jute. Besides, it is necessary to sink considerable capital in machinery to treat flax on a large scale. I don't think you would ever induce the individual cultivator to put up a small machine of his own for the extraction of flax. It would be rather costly, and more than he could afford.

Q. I think retting is done in small quantities at a time?—A. I understand that in recent years attempts have been made in Ireland to establish co-operative organizations for retting and scutching flax. This would be the only way in which such work could be done in India. For the individual cultivator to do it, it would be a question of the machine. He could do it by means of a bamboo hammer and the scutch, or by a knife made out of bamboo, but it is an extraordinarily slow process under those circumstances. That is one of the things which limit production of sann hemp in the Punjab. The process is so slow, and is not worth the time devoted to it.

Q. By 'central retteries' what sort of area have you in mind?—A. In Bihar where they grew flax, and where the chief experiments have been made so far, they had about 100 acres, and they said that they could conveniently deal with even 200 acres.

Q. You don't know anything personally about flax grown in Assam?—A. The original experiments with flax in Assam were initiated by me and I have been in close touch with all subsequent work.

Mr. A. Chatterton.—Q. You say in regard to sisal, "there are quite simple implements capable of producing good fibre, which would always have a ready sale." Can you tell me what these implements are?—A. The implement I was thinking of is a hinged knife.

Q. Have you any experience in extracting fibre?—A. Yes.

Q. Do you think it would be simple to extract sisal hemp on a scale which the small cultivator might try in starting?—A. Yes, if he had two or three plants of sisal hemp.

Q. Have you tried that machine for extracting plantain fibre?—A. Yes; but I don't believe in plantain fibre, not the edible plantain, because it is too weak. Plantain fibre that I have seen was always far too weak, except as a paper-making material.

Q. Do you know, in the case of plantain fibre, whether the strength of the fibre depends very largely on the time when the trees were cut?—A. I should think it would; I have not tried cutting trees at definite stages of their growth, but I think it would. If you cut the tree while the plant was in a young stage, the fibre would be weaker.

Q. Plantain fibre is always condemned, but I have seen a good deal of it manufactured into ropes, and it seemed to be capable of development?—A. In Bengal and Assam we have had hundreds of samples, and have not come across one fit for cordage fibre. Not very long ago samples of plantain fibre came from Burma, which were very favourably reported on in London. Perhaps the Burma conditions were better.

Q. Is it worth while taking up properly, the extraction of plantain fibre on a small scale?—A. It would have to be a cottage industry. I don't think it is the sort of industry that any except the adult male members of a family could carry on, and the question would

be whether their time would not be spent more profitably elsewhere. The content of fibre is only 1½ per cent. of the plantain tree; that would be the average in Bengal. You would have to deal with an enormous amount of the material to get a proper quantity of fibre.

Q. Do you think that plantain fibre might be cultivated as a cottage industry?—A. That is entirely a question of the quality of the fibre. I would not advocate it in Bengal, as my experience is entirely against it.

Hon'ble Pandit M. M. Malaviya.—Q. You say that "it is practically certain that the whole of the increased area put under jute in the period 1910-14—roughly 400,000 acres—was at the expense of food grains; but even then there is an area of over a million acres which cannot be accounted for by the statistics available, and which apparently went out of cultivation; in fact it would appear that the increased area put under jute caused a much more than equivalent reduction in the area of food crops"; and then you go on to say that "it is a question how far such a process can go on, and that although increased yields of food crops will be made possible by the work of the Agricultural Department, it would seem that, as far as present conditions are concerned, Bengal will soon reach the limit of economic safety, if it has not already done so, in regard to jute production." Have you any remedy to suggest for this state of things?—A. My suggestions were to extend the area on which jute or other fibres, like Hibiscus, are grown. Without doubt you could go into Bihar with jute.

Q. Do you think that by increasing jute cultivation in Bihar, you would induce cultivators in Bengal to give up jute in preference to rice?—A. It would be a question of price which would tempt the ryot in Bengal to go beyond safe limits. He is getting a very high price for jute and is attempting to put down more jute than is safe.

Q. But you say that the demand is going to increase, and would that not sufficiently stimulate the cultivator to put down a larger area under jute?—A. You will mitigate the difficulty if you extend the area.

Q. You have no other remedy to suggest?—A. I have stated in my written evidence that the work of the Agricultural Department will eventually, after a number of years, increase the outturn of jute by something like 25 per cent.; but at the time when this has been achieved, the increased demand promises to be much greater than an increment of 25 per cent. I don't see that there is any other remedy than to bring in new tracts, in India or otherwise, as producers of jute or of similar fibres. On the whole it seems that the years when the prices of jute, or the area under jute, has been greatest, in those years the areas under rice seem to have decreased.

Q. You say that clearly enough, "since the commencement of the War which caused a shrinkage of over 25 per cent. in the area under jute, rice cultivation has shewn a rapid and progressive recovery?"—A. It is necessary to take the War into consideration. The War has entailed freightage difficulties; and these may have brought down the price of rice. Since the War began, freight from Burma has enormously increased.

But the fact that the rice that used to go to certain areas has not gone but has been available in India, would not explain the increase of area in rice crop during the last two years.

President.—Q. There has been an increase in the rice crop and there has also been a decrease in the consumption of rice on the part of enemy aliens?—A. A large increase in the rice area under such conditions is very significant. The price of rice in India is less now than it was two or three years ago. In 1913 there was a large area under jute, and in that year the area under rice was lower than in the previous seven years. At the commencement of the War the prices of jute went down to a very low level, and the drop came in time to allow the cultivator to put an increased area under rice. In 1915 there was a still larger area of rice and a very large drop in the area under jute.

Q. You say that the "limit of economic safety" has been or will soon be reached in this matter?—A. Yes, I think that is the conclusion one would draw from a study of the subject.

Q. But it does not necessarily follow?—A. The greatly increased prices in recent years are an indication to start with. Since 1910 we have had a series of years of very high prices for jute, which showed a continuous tendency to advance up to the time of the commencement of the War. The area under jute also rose in this period, but has never reached the area in the forecast of 1907. That is an indication that considering the profits they are making out of jute the cultivators would have gone further if able to, and they would have put a much larger area under jute.

Q. This balance will work naturally, i.e., when the people find that it does not pay to grow jute, they will not grow it. The United Kingdom is a food-importing country, but that is not necessarily bad economically?—A. The conditions are rather different; Bengal is not an industrial country and must admittedly be largely self-supporting in the matter of food; yet there have been in recent years one or two instances of considerable shortage following a big slump in prices of jute. In 1907 the conditions in Northern Bengal approached more nearly to famine than they ever did.

Mr. C. E. Low.—Q. That position has been already reached in various parts of the cotton tracts, so that the relative proportion of cotton and food crops fluctuates habitually from year to year, according to the cash value the cultivator gets for his cotton?—A. It all depends on

whether you get these periods of considerable shortage due to excess of cultivation of the non-food crops.

Q. The value of cotton exported from the Central Provinces fluctuates between 7 and 11 crores in two successive years; do you consider that unnecessarily unsound economically —
A. It is a question of food supply entirely. Granted this, if the cultivation is profitable, it is an absolutely sound proposition. It must be the reverse, on the other hand, if there are periods when the food supply goes short.

WITNESS No. 124.

Mr. A. C. Ghose.

MR. A. C. GHOSE, *Superintendent of Sericulture, Bengal.*

WRITTEN EVIDENCE.

Capital.

Q. 1.—Many a time I tried to induce my countrymen to buy raw silk and sell but none came forward. I proposed to the late Director of Agriculture, Bengal, to lay out Government money but this was not accepted.

If a rich firm can be started by the help of Rajas, and Maharajas with a reliable manager under Government supervision, the poor cultivators may be saved and the Indian industry may thus get an impetus.

The failures of many Indian enterprises are principally the reasons for the apathy of the Indian capitalists.

I know of the silk industry only. The policy of starting silk worm seed-rearing nurseries or farms was started by me in my own quarters and at my own cost as also the experiments in connection with the foreign silk worms. The former has been a success while the latter is still in an experimental stage.

Government is encouraging the silk worm rearers to raise silk worm seed-cocoons through some "selected rearers" according to Pasteur's system under continual Government supervision as is done in the Government silk worm seed rearing nurseries, a method adopted in all the foreign silk countries.

Government assistance.

Q. 4.—Loan of thread-nets and microscopes and, where necessary, free distribution of disinfectants are given. Also a sum of Rs. 250 for the erection of a model silk worm rearing house and a microscope at a cost of about Rs. 60 to those who pass out annually from the sericultural schools at Rajshahi and Berhampur.

Q. 5.—No money grant is necessary, if Government will kindly continue the policy of trying to raise the numbers of "selected rearers" to produce silk worm seed-cocoons as proposed in 1916 by the Director of Agriculture, Bengal, which will cost Government for the supervision and loan of thread-nets, microscopes and some disinfectants.

Loans will be very good and a 3 per cent. loan will be a boon to the silk cultivators of Bengal on the recommendation of the Bengal Sericultural Department.

Whenever necessary Government should purchase indigenous products.

Q. 6.—The present method followed by Government for the control of the Bengal sericultural Department is sufficient.

Q. 7.—The demonstration farms which are directly under Government control as at present, are very good but at the same time the silk cultivators as well, should be encouraged through selected rearers to raise silk worm seed-cocoons a method followed by all the foreign silk producing countries, as proposed by Mr. Blackwood, the late Director of Agriculture, Bengal, and this proposal would be a practical demonstration by the cultivators themselves to others under strict and continual Government supervision.

Q. 8.—The present measures taken by the Government of Bengal is sufficient which will have to be continued permanently.

Q. 9.—I am concerned only with the silk industry since the last 28 years and at present the scheme is hampered owing to want of funds due to war and there is nothing to grudge.

Q. 10.—Not necessary for silk industry.

Q. 11.—No, none to my knowledge.

Q. 12.—The object of the co-operative societies are certainly very good and if they can help the silk worm rearers, the reelers and weavers, undoubtedly they can do much, but up to this time, as far as my knowledge goes, nothing has been done. I have no practical knowledge regarding co-operative societies but I think if Government can advance in a big village Rs. 1,000, the villagers may also be able to contribute the same amount, from which fund loans may be given at a low rate of interest to the poor cultivators, reelers and weavers.

Q. 13.—The existing scheme followed by the sericultural section of the Bengal Agricultural Department is sufficient and I suggest that the scheme be extended fully as funds are available.

Q. 15.—My practical experience goes so far as silk industry is concerned.

technical aid.

The Government aid given to the silk cultivators has already been referred to above.

Q. 16.—My personal knowledge and experience of the Bengal silk cultivators benefited by the Bengal Agricultural Department from researches under the Bengal Government, is that the silk worm rearers get successful crops from the nursery seeds reared scientifically in Government farms and sold to them at a reasonable price.

Q. 17.—The system by which Government officers are already helping the silk industry is satisfactory.

Q. 23.—I think the Advisory Council for Research cannot give assistance to the Bengal silk industry.

Qs. 25, 26 and 27.—Surveys are not necessary so far as silk industry is concerned.

Q. 30.—This is a subject which I pointed out to Mr. Blackwood, the late Director of Sales agencies. Agriculture, Bengal, on my return from deputation in 1913 to the Punjab, United Provinces, Bombay and the Central Provinces. In the Punjab and United Provinces about 15 annas of the silk market, while in Bombay and Central Provinces about one-third of the silk market have been monopolised by the Japanese and Chinese silk. This success has been attained by the merchants and agents deputed from those countries.

In the winter of 1913 I personally met a Japanese officer at the Crawford market in Bombay with samples of raw silk and silk pieces, giving addresses of different firms in Japan. I have also learnt from the silk sellers in the Punjab, United Provinces, Bombay, Guzerat and Central Provinces that Japanese and Chinese merchants come to them with samples but none from Bengal. I would therefore suggest suitable facilities be afforded for cheap and extensive advertisements all over the country and the example set by Japanese and Chinese enterprise be followed in this country as well.

Suitable European markets may also be approached by effective advertisement through the deputation of a competent European official.

Q. 31.—Very good. They give an impetus to the silk cultivators and an advertisement Exhibitions. to the purchasers as well. Government encouragement is desirable. The usual help by Government subsidy is sufficient but public help and co-operation is absolutely necessary, especially in accommodating the exhibitors and providing board according to Indian customs in mofussil districts, for want of which, the private exhibitors, I have personally seen, suffer much and so much so that at the next exhibition they would never come again.

Exhibitions should aim merely at bringing the sellers and buyers into contact.

Q. 34.—There should be trade representatives as I have suggested in my answer to Trade represen- question No. 30, for foreign countries, but for Indian markets an Indian official with special tatives. knowledge of silk industry will be suitable. Their duties should be to advertise and get purchasers by showing samples of different owners of silk filatures and merchants and samples of silk pieces from the weavers in Bengal, as the Japanese and Chinese Governments are doing.

Q. 35.—Temporary Commissions may also serve.

Q. 36.—Co-operation of representatives of each province will undoubtedly be very good to check the incoming of foreign products.

The representatives of all the provinces may hold meetings annually and thus co-operate with one another as is done regarding other Government administrations.

Q. 37.—Both the publishing of lists and exhibiting articles will certainly enable the Government Indians to know what they cannot do and very likely, it may tempt them to try for the patronage. production of those articles in India.

For Bengal silk industry, I beg to suggest the recruiting of a dyeing expert and if an experimental station can be started to prepare pucca dye from our indigenous products it will be a very great help for the sale of Bengal silk in the foreign countries and the experts of different provinces should meet often for consultation and help each other.

NOTE.—Witness did not give oral evidence.

WITNESS No. 125.

MR. GANAPATRAI KHEMKA, *Honorary Secretary, representing the Marwari Chamber of Mr. Ganapatrai Commerce, Calcutta.* Khemka.

WRITTEN EVIDENCE.

The Committee of the Marwari Chamber of Commerce feel that there is a great need for Banking facilities a well organised system of banking, without which the economic progress of this country is never possible. There should be a great bank in every province, and it should receive full support from the Government. Such banks are necessary for giving financial aid to industrial enterprises, for want of which many of them have failed. These banks should advance loans, for industrial undertakings, on security, e.g., of machinery and plants, stocks and shares, etc. Money grants-in-aid and supply of machinery and plant on the hire-purchase system, may be made also in parts of the country where the people are very poor, for development of cottage industries.

Commercial edu-
cation.

The Committee realise also the importance of higher commercial education for industrial development and suggest that steps should be taken by the Government for encouraging higher commercial education and practical training also in actual manufacture.

NOTE.—Witness gave oral evidence in vernacular, of which the following is a summary.

Witness stated that banks should exist in each province for giving financial aid to industrial enterprises, and if they were under the supervision of experts appointed by Government, it would easily inspire confidence and the public will more willingly subscribe to the capital. Marwaries as a class are rich men and are capable of a starting such banks themselves, but in witness' opinion such banks would inspire no confidence.

WITNESS No. 126.

Mr. R. P. Adams.

MR. R. P. ADAMS, A.M.I.M.E., *Chief Inspector of Factories, Bengal.*

WRITTEN EVIDENCE.

Capital.

Q. 1.—I have had no experience in regard to the raising of capital for industrial enterprises but I believe there is no difficulty whatever in raising capital for industries which have already proved a success provided the promotion of new concerns are in the hands of firms of good repute. I understand that Indians generally find it difficult to raise capital on account of the many failures in concerns started solely by Indians. Government should certainly encourage Indians in the development of industries and Local Governments would I think be in the best position to decide to what extent assistance is desirable or necessary.

Q. 3.—The two principal industries in Bengal are jute and coal and, in both these, periods of prosperity are invariably followed by periods of over-production, necessitating short-time employment.

Several large flour mills have been started in Calcutta during the last 5 or 6 years, resulting in a steady over-production and most of these mills have had to work intermittently to curtail outturn.

Government
assistance.

Qs. 5 and 6.—The desirable method of giving Government aid to existing or new industries would depend largely upon the nature of the industry concerned. For example, the existing method under which Government guarantees the dividends on new railway projects appears to be satisfactory but Government would hardly be justified in guaranteeing dividends on new industrial concerns, especially in a case, such as a concern for the manufacture of steel, in which an enormous capital would be required. In such cases Government should, if necessary, be prepared to provide part of the share capital, preferably the ordinary capital, and sell their interests in the concern to the public as soon as the business reached a reasonable dividend paying stage. If the outturn of such a concern is required by Government, as it probably would be in the case of steel, there should be no objection to Government guaranteeing the purchase of a portion of the outturn for a limited period. Government should not assist in the starting of any industrial concern unless there is a reasonable prospect of the products being placed on the market at rates that would compare favourably with the same class of articles imported from England or the allied countries. For such time as Government held shares in a commercial concern they should be represented on the Board of Directors and the accounts of the concern should be subject to Government audit.

Pioneer factories.

Qs. 7 and 8.—I have no experience of Government pioneer factories but I am of opinion that pioneer factories should be initiated wherever it is considered that there is a reasonable prospect of establishing and developing a new industry. When such an industry has been established, the Government pioneer factory should be sold to private capitalists unless it is considered necessary to retain it as a demonstration factory for the benefit and training of Indians.

Several small companies for the manufacture of such articles as pencils, matches, soap, cigarettes, leather, etc., have been started by Indians in Bengal in recent years but in almost all cases the concerns have proved a failure, largely owing to insufficient capital having been obtained at the outset, necessitating borrowing at high rates of interest.

Government
assistance.

Q. 13.—There would be no need for Government to aid an industry which had already been successfully established, and Government aid could hardly be considered to interfere with private enterprise in the case of an industry which had not been successfully established.

Demonstration
factories.

Qs. 18 and 19.—There are about 150 oil mills and about 50 rice mills in Calcutta and its suburbs, all owned and managed by Indians. These concerns are inefficiently managed. The machinery, in nearly all cases, is badly laid out, and the cost of maintenance of the driving power is generally very high. Government might, for each of these industries, start a demonstration factory which should be equipped with up-to-date and well laid out machinery, and provided with an economical driving plant. The staff should be allowed to advise Indians in all matters regarding the efficient management of such factories. These industries are seriously handicapped at present for want of expert advice, especially in regard to questions of suitable machinery and repairs. It is, moreover, a notorious fact that, in

Calcutta where fuel is cheaper than in almost any other city in the world, the rates* charged by the Electric Supply Corporation for small power users, are so high that the factories have invariably considered it cheaper to install their own small steam plants. These small installations are, however, far from being economical, and are expensive to maintain.

Q. 38.—The rules relating to the purchase of stores by Government departments should be revised. Government departments should adapt their requirements as far as possible to articles manufactured in India provided there is no marked difference between the prices demanded for locally manufactured articles and the prices at which similar articles can be imported from Europe. As regards articles which have to be imported, either because they cannot be manufactured in India or because the prices demanded are prohibitive, Government departments should be free to purchase their requirements either through local agents or through the India Office. There are serious objections to the present system under which departments are required to indent nearly a year ahead for articles to be supplied during a subsequent year. Under existing circumstances indenting officers cannot accurately gauge their requirements so long ahead and there is a tendency to indent on a liberal scale, which results in extravagance. Moreover, departments, such as the Jail Department, indenting for articles which are intended for meeting anticipated requirements of other Government departments are sometimes unable to dispose of quantities of stores on account of the purchasing departments changing their requirements without sufficient notice.

Qs. 44 and 45.—Jute mills in Bengal have in recent years spent large sums in improving the conditions under which their labour live. The improvement has been effected by the provision of pucca built dwelling houses adjoining the mills and by attention to sanitary arrangements and filtered water supply. This naturally tends towards the retention and the consequent better efficiency of labour. It seems a pity, however, that so much money should be spent in this direction without obtaining expert advice as to the best kind of houses suitable for these requirements and sanitary arrangements best suited to this country.

There is another matter which appears to require attention. In all the more important industries, labour is largely obtained through contractors or through sirdars. If it were possible to break down this system and employ labour direct, it would certainly be beneficial to both employers and the labour. At the present time, especially in textile factories, the labour is almost entirely in the hands of the sirdars and time-keepers, who systematically extort money from the workers and are not only the direct agents in causing strikes but are also responsible for the continuous shifting of labour from one factory to another. Strikes are generally engineered on the introduction of any change in working hours beneficial to the labour but detrimental to the sweating of labour. The shifting of labour from one factory to another is arranged with a view to extortion of money before re-employment. The fact that about 25,000 children are employed in the mills in Bengal and that about 28,000 certificates are granted annually on first employment in each factory bears out the statement that labour is constantly shifting.

Q. 51.—As a general rule only boys who have had a good general education should be selected to be trained for positions of supervisors or skilled managers and before they start to learn the practical work of the industry for which they are intended they should spend one or two years in a technical college. In the case of engineers an apprenticeship of at least five years is essential, after which a man should gain further practical experience as a workman before being elevated to any responsible position. In all industries a thorough practical experience is necessary and should receive greater attention than theoretical knowledge obtainable at a technical school.

Q. 54.—Engineers in charge of prime movers are not required to hold certificates in Bengal but, under the Bengal Steam Boilers and Prime Movers Act, boiler inspectors can revoke or suspend any boiler certificate granted under the Act when they have reason to believe that the boiler or prime mover in respect of which it has been granted is not in charge of a person competent to have charge of it. In provinces where certificates are required for engineers the standard of examination should be uniform and Local Governments should recognise each other's certificates.

Q. 55.—At present no facilities exist in Bengal for providing men with certificates. It ought to be possible for anyone in Bengal to obtain a certificate but I would not make it compulsory. This would enable owners to obtain certificated men if they wished to do so.

In this connection, I wish to add that all regulations regarding the survey of boilers and prime movers throughout India should be uniform.

Q. 108.—As I acted for three years as superintendent of jail manufactures in Bengal, I am in a position to state that complaints regarding competition by jail industries would be unreasonable. The average daily number of trained prisoners employed on industries in all the Bengal jails does not exceed 4,000 and these men are employed on various industries but chiefly in connection with the manufacture of articles required by the Jail Department. There cannot, therefore, be any appreciable interference with private enterprise when such a small number is employed in a province with a population of about fifty million inhabitants.

* See letter No. 17698, dated 12th December 1916, from the Agent and Chief Engineer, Calcutta Electric Supply Corporation, printed at the end of Mr. Adam's oral evidence.

Jail industries should be developed to the fullest extent possible and there should be no restriction against the employment of power driven machinery in jails. It must be remembered that prisoners, in a large number of cases, have no training of any description when first admitted into jails and that, if they are long term men, they usually come out after having received a useful training in some industry and their earning capacity is thereby increased.

It should also be borne in mind that the sale of jail manufactured articles is a source of revenue of the Jail Department and is set off against the expenditure of that department. This is obviously in the interests of the taxpayer and there should consequently be no restrictions regarding the manufacture and sale of such articles.

General.

Q. 110.—I have had occasion to visit most of the tanneries in Bengal during the past year in connection with the question of supply of tanned hides to the Home Government. Enormous quantities of hides are shipped from Calcutta, chiefly to the United States and the Continent, and most of the export trade is in the hands of foreigners.

There are at present only about five tanneries in Bengal, all of which are small and of little importance. There appears to be no doubt that the tanning industry is one which could be very largely and profitably developed. The money that is now spent in the preparation of skins for shipment abroad would, to a great extent, be saved, as such preparation would be unnecessary if the skins were tanned in India and this would, moreover, have the desirable effect of taking the trade out of the hands of foreigners.

In developing this industry it would be necessary to employ a large staff of trained European experts.

I have on various occasions visited the Calcutta Pottery Works and am convinced that this is an industry which admits of development. There is a large demand in India for porcelain insulators for electrical purposes. This demand has hitherto been met by importing these articles but I do not see why there should be any difficulty in manufacturing them in pottery works in India.

Qs. 112 and 113.—The manufacture of paper in India, at present, has to depend almost entirely on raw materials, such as wood pulp, caustic soda, bleaching powder, sulphate of alumina, white clay, etc., which have mostly to be imported from Scandinavia and other parts of the Continent. Paper mills have experienced some difficulty since the outbreak of war in obtaining these materials and high prices are having to be paid. Almost all these raw materials could be manufactured in India. As regards wood pulp, which is required in large quantities, experiments have already been carried out on a small scale by the Titaghur Paper Mills Company and it has been demonstrated that bamboo, which is obtainable in large quantities in India and Burma, can be successfully converted into pulp suitable for the manufacture of paper. The only difficulty seems to have been the capital required to lay down a plant large enough to turn out the raw material in paying quantities.

ORAL EVIDENCE, 9TH DECEMBER 1916.

President.—Q. You say, "The rates charged by the Electric Supply Corporation for small power users are so high that the factories have invariably considered it cheaper to instal their own small steam plants." Will you tell us what rates are charged?—A. A variety of rates are charged according to the quantity of current used. It is generally so much per unit, plus about Rs. 5-8 per month installation charges.

Q. What would be the average rate per unit?—A. That again depends entirely upon the quantity used. If a man has a motor running continuously, it works out fairly cheap. But if, on the other hand, the motor works for only four or five days a week and, say, for only seven or eight hours a day, then the rate would work out to be expensive.

Q. Can you give us an idea of the scale of charges that are made?—A. I cannot tell you. A scale of charges can be obtained from the Electric Supply Corporation.

Q. Can you give us some rough idea as to what is the minimum charge for continuous work?—A. In the case of large consumers it works out to less than half an anna, whereas in the case of small users the rate may vary from two annas to four annas.

Q. And in those circumstances, if it were as much as two annas it would pay an oil mill to install its own steam plant?—A. I think so.

Q. You say, "The rules relating to the purchase of stores by Government departments should be revised." You do not say in what particular they should be revised?—A. I say that a Government department should be allowed to purchase stores either through Indian agencies or through the Director of Stores at home, as may be considered most suitable for the department.

Q. But the rules as at present issued encourage the actual purchase of stores in India?—A. Yes, but not European stores.

Q. You mean that the Government should also purchase European stores imported by private firms?—A. Yes.

Q. In what way will that assist industries in the country?—A. That won't assist industries at all.

Q. We are not here to support a purely commercial trader. We want to know in what way these rules can be revised for the purpose of encouraging the industrial development of the country?—A. It should be possible in some cases for Government departments to adapt their requirements more to articles that are produced in the country than is done at the present time. According to the present rules it is necessary to indent for all European stores through the Director General of Stores.

Q. If they cannot be obtained in this country?—A. If they are not manufactured in this country. But what I say is that they should be obtained either in this country or at home, whether manufactured here or not, according to the convenience of the department.

Q. I do not see what advantage there is to purchase European stores through a firm of importers?—A. The advantage is you can obtain stores immediately instead of waiting many months for them. Further buying locally one can obtain exactly what is required, which is not always the case when stores are purchased through the India Office.

Q. But surely if the India Stores Department is organised properly they should get better terms than any Calcutta importer can get?—A. I believe the majority of the European concerns are prepared to supply stores at the same rate as the India Office.

Q. They would not be able to get contract advantages. They would not be able to make forward contracts and you throw the responsibility as to quality on the purchasing officer instead of on a specially organised Government department of expert buyers? You have not made any case for the revision of Government rules on this matter. The Government rules are perfectly clear that if an article can be obtained in this country up to quality, the country made article should be given distinct preference?—A. Forward contracts may be suitable for large consumers like the military, but here again these contracts can be arranged from India through local agents. In the case of small Government departments there is no advantage at all in forward contracts. Presumably heads of consuming departments are able to judge the quality of the material they require.

Q. Have you read the rules recently?—A. Not very recently.

Q. You say that there is a good deal of shifting of labour from one factory to another, and that consequently the time-keepers and sirdars have obtained profit by the re-engagement of men who have been discharged by one mill and taken on in another. Is it possible for the factories to co-operate as regards the recruiting of labour?—A. It may be possible to do something in that direction but considering the enormous number of people employed it will be extremely difficult.

Q. Would you suggest any Government agency?—A. This is a serious problem.

Q. You can make no proposal for the Government organisation of labour so as to prevent the shifting of labour from one factory to another?—A. At the present time, certificates for children are granted in each factory so that when a child joins a factory a certificate is granted. Instead of that, I thought it might be possible to grant these certificates in each district only, so that a child would have to obtain a certificate at one office in each centre, and it might be possible then to keep in touch with these children. When entering a mill the certificate would be given up to the manager of the mill, and the child should not again be employed in any other factory without producing the same certificate.

Q. But will that not interfere with the liberty of a man to go and join any factory he likes?—A. That is the point.

Q. Your main reason for raising the question is to protect the labourer himself?—A. Yes.

Q. You have not made any proposal to remove this difficulty. You merely complain of the disadvantages of the present practice. You have no remedy for that?—A. No.

Q. You say, "In provinces where certificates are required for engineers the standard of examination should be uniform, and Local Governments should recognise each other's certificates." Is it not advisable that all provinces should require certificates for engineers and men in charge of prime-movers?—A. I do not think so.

Q. Is it desirable in Bengal?—A. I do not think so.

Q. You think the present system in Bengal is better than that which prevails in some of the provinces where they require the men to have a certificate of efficiency?—A. I do not say it is better. In Bengal in the last ten years there were only four accidents causing injuries to nine people for an average of 4,000 boilers working. That seems to me to be very good. I do not think you can improve on that.

Q. If you had certificates of competency would you expect that the boilers would be turned to better account and the machinery live a longer life, apart from the accidents?—A. I do not think so.

Q. You think the present arrangement is quite good enough?—A. Yes. I think there is no case for introducing certificates in Bengal.

Mr. A. Chatterton.—Q. Supposing legislation were introduced, would you distinguish between prime-movers and steam boilers?—A. No.

Q. In Bengal are all the boilers annually inspected and passed by the inspector?—A. The whole of Bengal is not under the Boiler Act at the present time.

Q. You mean that in part of the province the boilers are not subject to any annual inspection?—A. Yes. But proposals have been submitted to Government to bring the whole province under the Act.

Q. How do you account for the very small number of boiler accidents in Bengal?—A. Compared with home, I think the requirements of the Boiler Act is above the home standard.

Q. In the districts where the Act is in force?—A. Yes.

Q. You mean that the specifications which are passed by the boiler inspector are more stringent than they are in England?—A. Yes. What I mean is this that the boiler rules throughout the whole of India are very largely based on the Board of Trade rules. At home they do not require the same conditions as we require out here.

Q. Have you any information regarding the tracts which are not under the Boiler Act?—A. A year or two ago, a boiler exploded in one of the districts and injured about 100 people. That district has since been brought under the Boiler Act.

Q. Are those districts which are not under the Boiler Act less advanced industrially?—A. In the outlying districts there are few boilers. When the Boiler Act was first started, it was limited in its application to Calcutta. It was then extended to Narayanganj and Dacca. The Boiler Department is a self-supporting Department, and extensions have only been made to places where it was possible to carry out the works without incurring financial loss to the department.

Q. Would you recommend in the interests of industrial development that the Boiler Act should be applied throughout the country?—A. I should certainly say so. We have already asked Government to extend the Act to the whole of Bengal.

Q. You have expressed here some opinions regarding the functions of jails in regard to the manufacture of goods. On what principle do you approve of jails setting up machinery and turning themselves into factories?—A. It is because they should take the best possible advantage of the labour that they have got. This will make the department as nearly self-supporting as possible.

Q. Is it not practicable with hand industries which require no expensive plant?—A. Unfortunately there is nothing to pick up in the way of hand industries which will pay. Carpet weavers at present would earn about half an anna a day. That hardly pays.

Q. Is that because the jail rates are too low and compete with the outside manufacture in carpets?—A. It is partly because the jail labourer works for about six or seven hours a day. It takes a tremendously long time to get the jail labourer to make carpets, and he is learning the work most of the time.

Q. Would you approve of the establishment of a jute mill in a central jail?—A. No objection whatever. We already have one in Bengal.

Q. The justification for having these factories inside a jail is that they would train the prisoners and they would be able afterwards to earn an honest livelihood?—A. Yes.

Q. Do you think it is easier to teach prisoners to work machinery than practise handicraft?—A. That is so.

Dr. E. Hopkinson.—Q. If a boiler explosion occurs in Bengal, is there any inquiry?—A. There is always an inquiry by the Boiler Department.

Q. And if the boiler is found to be faulty, or if the explosion is due to the culpable negligence of the owner, is he liable for damage?—A. I believe, if there is culpable negligence, he is liable under the Penal Code. In one case a boiler was working without a certificate and the manager was prosecuted on that account under the Boiler Act. In two cases tubes burst on account of sediment, and in another case a boiler exploded inside an engineering works.

Q. The manager was always fined?—A. Only in one case in which the manager was fined because he worked the boiler without a certificate.

Q. Is it part of your duty as Chief Inspector of Factories, to enquire into the housing condition of the working people?—A. No, but we do so.

Q. It is not definitely your province?—A. No.

Q. You have no powers?—A. No.

Q. You do it if it is within the factory compound?—A. From the sanitary point of view we then have power to deal with it.

Q. As a matter of observation, however, you find conditions improving in this respect?—A. Yes.

Q. Does the half-time system obtain in Bengal?—A. Yes. Children work six hours a day. In the textile factories the coolies work 13½ hours. The children are still called half-time workers though they do not work half the time the mill is running. Half-timers are supposed to be between nine and fourteen years of age.

Q. What time do they work?—A. Six hours a day, for six days, in textile factories, and seven hours in non-textile factories.

Q. It is part of your duty to see that the regulation is carried out?—A. Yes.

Q. Have you had any occasion to suggest to mill managers that the factory children working only half-time should be given education?—A. Yes. I have discussed the question with several managers. The majority seem to be of opinion that it will be very difficult to get them to go to school.

Q. You do not know of any case of a school being set up by a factory?—A. A school was established by a jute mill a few years ago, but the only children attending are the children of clerks and shopkeepers in the immediate neighbourhood. This particular school was actually built by the manager himself.

Q. In no case is the attendance at school compulsory?—A. No.

Sir D. J. Tata.—Q. With regard to the effect of the housing question upon the shifting character of labour, do you think that it would pay the employer of labour to look to the better housing of the employees with a view to settling them?—A. A large number of houses have been built in Bengal in recent years simply to attract labour to textile factories.

Q. And such houses should be, of course, in the immediate vicinity of the factories where the people are working?—A. Yes.

Q. Are the conditions such that the houses can be built in the vicinity of these factories? The factories may be in the thick part of the town, where building sites are not available?—A. Of course, it depends upon what property the mills possess. When a mill has property available it is generally utilised for constructing lines, or houses, for their own employees.

Q. And does that help in settling labour to a great extent?—A. Yes.

Q. Do you think that the Government or the municipalities can help in the matter at all by way of legislation, or otherwise?—A. I think Government could give some advice with regard to the class of houses best suited for the purpose, and also in sanitary matters. At the present time factories spend large sums in this direction. The different mills have their own ideas as to the best class of house required but I think the money could be spent to much better advantage.

Q. By building a better class of houses?—A. Yes, and by obtaining expert advice.

Q. Is it part of your duties to inspect those buildings which have been put outside the factory walls?—A. No. But we do so.

Q. In one place you say that the failure of the various factories is due to insufficient capital but a little later you say that these concerns are inefficiently managed. Which of these conditions operates more for failure?—A. Inefficiency.

Q. Want of capital is really due to inefficiency?—A. If efficient management was assured capital would be forthcoming.

Q. Then this statement that failure is owing to want of sufficient capital is not quite correct?—A. It does not reply all that I mean.

Q. It is practically inefficiency of management that fails to secure capital?—A. Yes.

Q. If there was good management capital could always be secured?—A. Yes.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. You say that in a certain mill the manager started a school. Did he charge any fees?—A. I am not sure. If a fee was charged it was very nominal.

Q. It charges fees?—A. I am not quite sure about it.

Q. What about these half-timers? Don't they go after work in one mill to another mill?—A. They do in some cases, but this is prevented as far as possible.

Q. But if they have a school and the boys are compelled by the factory people to go to the school, I suppose this will go away, that is, this difficulty of the boys of one factory going to another factory in the afternoon? I think you cannot avoid that whatever inspection you have?—A. That is so. But the great objection to school, after working in the local mills is, that the children in many cases come a long distance to their work, and in other cases children live on one side of the river and work in the mills on the opposite side of the river. If they have to go to school also, it means they are away from their homes twelve hours a day.

Q. They generally stay the whole day out?—A. That is the objection that the mill manager will put forward. I do not think there will be much good in having a school unless the education is made compulsory.

Q. Are those who come to the school Bengali boys?—A. They come from numerous districts outside Lower Bengal with their parents.

Q. Is there any medical aid provided for them?—A. Each mill has got a medical officer.

Q. And they supply medicine free?—A. Yes. In all cases.

Q. Any grain shops? Do they supply grain cheaper during the famine times?—A. No. Some of the mills supply iced water in the hot weather.

Q. No grain shops?—A. There are grain shops near by but in a few cases the mills have actually built these shops.

Q. And provided them with grain at cheaper rates?—A. They simply built the shops and let them to the Marwaries. There are cases in which small grinding mills have been started in the bazaar and the current for running these mills is actually supplied by the mills at very low rates.

Q. They do not give any flour or anything else cheaper?—A. No.

Q. There is no Act to force them to have any medical officer or anybody else attending the mill factory people?—A. No.

Sir F. H. Stewart.—Q. Do you inspect the rice mills in Calcutta?—A. If there are any mills they come within the Factories Act. I have visited a large number of them.

Q. Have you had anything to do with the administration of "Smoke Nuisances Act"?—A. I am a member of the Commission.

Q. If the rates of power are reduced you think that many of these small mills would be in a position financially to avail themselves of electric power?—A. It would cost these people nothing at all if the Electric Supply Corporation not only gave current but supplied motors as well.

Q. With reference to questions 44 and 45, do you know personally or officially that the firms were spending large sums of money but not taking expert advice?—A. I do not know where they can get expert advice.

A. Your own?—A. They are not required to take my advice. Expert advice is advice from men at home, that is, with modern experience.

Q. Do you mean that the firm should go to England to get expert advice to put up houses for their labourers?—A. Expert advice should be provided by Government if not available otherwise. The septic tanks built in Bengal are not up-to-date. The same thing applies to houses. It is not necessary to get men from home to build houses suitable for workmen. In the majority of the houses, not more than 300 cubic feet of air space for head is provided whereas the Factories Act require 500.

Q. With regard to jail industries, do you think it is a fair comparison to compare 4,000 labourers who are organised well and very strictly controlled in the jails with the general population of the provinces amounting to 50 millions? Do you not think that an organisation with very strict control of 4,000 persons will interfere with private enterprise?—A. No. It is to be remembered that these men take sometime to learn any particular trade, and they are not skilled immediately they come to the jail.

Q. Hon'ble Pandit M. M. Malaviya.—You speak of the attention which was paid by the factories with regard to the housing of labourers employed by them?—A. Yes.

Q. They look only to the physical comforts and the health of the labourers. Is there any provision in these factories for education or any arrangement for that kind of thing?—A. There is only one mill in Bengal where education is provided.

They have erected a school in their own village. The village is inside the mill property. The number of mill hands employed there is more than 4,000.

Q. Is there full provision, made for children of the school-going age?—A. No. I do not know what number can be accommodated in the school, but I think I am quite correct in saying that the school has never been full since it was started.

You have stated in reply to Dr. Hopkinson that there is no compulsion exercised upon these children to attend school?—A. No.

Q. Do you think it would be well if there was some compulsion?—A. It may be tried as an experiment in a district.

Q. Don't you think that there is some disadvantage in gathering together a large population without providing for their moral welfare?—A. The object of education is to make them more independent, and better able to look after their own interests.

Q. And they would be better workmen too? They would be more efficient workmen for the education that they would receive?—A. I think so.

Q. And that would help to do away with the system of sirdars?—A. Yes.

Q. In addition to what you have mentioned, have you observed any other evils arising from the system of sirdars? What kind of moral influence do they exercise over the persons whom they enlist in the service of the factory?—A. Generally they engineer all the strikes in the mills.

Q. I suppose you have seen many of these sirdars?—A. Yes.

Q. Do you think they are the right type of men to be entrusted with the guiding and controlling of the labourers?—A. I do not know how you could manage without them.

Q. Have you discovered any real reason why the system cannot be done away with?—A. No.

Q. Have you come across factories where the system of sirdars is not prevalent?—A. All the textile factories have the same system.

Q. Apart from these textile factories which employ sirdars, have you visited any other factory which has not got the system of sirdars?—A. That system does not apply to other factories to the same extent. In fact, to a lot of factories, it does not apply at all.

Q. Do they recruit labour?—A. Yes.

Q. They go about and induce the men and women to come and work in the factory?—A. Yes. The sirdar is put in charge of a certain section of machines, and the machines require a certain number of men to keep them working, and the sirdars are expected to find men for

working the machines. He shows about 16 in the books but actually employs about 12 or 13. Labour is plentiful.

Q. In addition to what he has received from the employer do you think that he makes something out of the labourers too?—A. Yes.

Mr. C. E. Low.—Q. The half-time workers work on shift system. Is this a single shift system?—A. We split the shift system.

Q. What do they do in the time between?—A. They play about the compound.

Q. Are they made to do more work by the sirdar?—A. Yes.

Q. Suppose a boy has done six hours in a factory do you think he is capable of receiving any intelligent education in any school after that?—A. I do not think so.

Q. Who are these sirdars? What type of people are they?—A. They are a sort of headmen. Anyone can become a sirdar.

Q. What does the sirdar make every month?—A. Anything from Rs. 30 to Rs. 70.

Q. How many coolies has he got under him?—A. It depends upon the department in which he works. In the spinning department, where a sirdar is in charge of children he generally has 16.

Q. Do you think that any system of compulsory education in the mills might necessitate some adjustment of the hours of work, and do you think it would be opposed by the sirdars?—A. I do not think there is the slightest doubt about it. There would be no difficulty if the factories would combine in order to enforce it, but there is no combination among the factory owners.

Q. You speak of the oil mills and rice mills in Calcutta. Very many of them have sprung up quite recently?—A. A great majority have sprung up in recent years. Those in Tollygunge are very recent.

Q. What sort of advice does the intending proprietor get as regards the supply of his plant and other things?—A. They generally buy their plant from agents in Calcutta who supply that particular class of machinery.

Q. Who shows them how to put down foundations for their engine?—A. This would be done by the agents supplying the machinery.

Q. Do you think it is efficiently done?—A. Yes.

Q. What sort of man does the agent for machinery employ?—A. A good commercial engineer, not a man with any vast experience in the running and laying down of plants of that kind. The plant that is put down is often not the most suitable for the job.

Q. You think some authoritative advisory agency would be welcome to people of that sort?—A. I should think so. I have been asked many times to give advice.

Q. It seems to me to be an extraordinary thing that a place like Calcutta with a large number of agencies for machinery of this type is not able to give efficient advice to the purchasers especially if they purchase new machinery?—A. The machines that are sold in Calcutta are machines that are built by the makers at home to suit the home requirements and the home makers never study Indian requirements.

Q. When the machine is set up is it kept up to the mark?—A. No. Very badly looked after as a rule.

Q. That means the employment of inefficient engineers?—A. Yes.

Q. Does not the owner find difficulty in knowing whether the engineer is efficient in the absence of any certificate?—A. I do not think a certificated man would necessarily be a capable man.

Dr. E. Hopkinson.—Q. Do you consider that a boy who works six hours a day in the mills is incapable of further work?—A. He has done quite enough if he has done six hours in a factory.

Q. He can do no other work in any form?—A. As a matter of fact he does, because he shifts from one mill to another.

Q. That is to his detriment?—A. Yes. He should not be required to work more than six hours.

Sir D. J. Tata.—Q. With regard to shifts do they have only one shift or two, so that when one set of boys work from 6 A.M. till 12 noon, another set comes and works from 12 noon till 6 P.M.?—A. In all the textile factories in Bengal, or in most of them, they have about six shifts for children, covering a working period of 13½ hours.

Q. Each of these shifts of boys has only got six hours to work?—A. Yes.

Q. These six hours are made up by three hours in the morning and three hours later in the day?—A. The morning shift works from 5-30 to 9 A.M. and comes back again from 4 to 7 P.M.

Q. How then can they go to work anywhere else?—A. A shift starts in the morning and there is nothing to prevent them from going to an adjoining mill and working in another shift at another mill. They come in and go about the mill as they like.

Q. Surely you could manage to keep them in the mill. After they work in the morning three hours, are they not kept under some kind of control all this time to work the other three hours later?—A. There is no restriction.

Q. If the A shift works for three hours in the morning can they not be kept in the mill in the school till the time comes for the next turn later in the day?—A. Yes.

Q. About the sanitation of dwelling houses, you say you want expert advice from outside. Is there not the sanitary department of the Government or the municipality available for consultation?—A. Yes. The Sanitary Commissioner and the Sanitary Engineer. It is impossible for them to deal with the whole of Bengal. There are Sanitary Inspectors in addition.

Q. This department is not sufficiently manned?—A. It is inadequately staffed.

Q. With regard to "sirdars," do they themselves work in the mills?—A. Yes. They are in charge of gangs of workers.

Q. And the men under them work in the same department?—A. Yes.

Q. On the Bombay side we call them "jobbers" and they are responsible for finding workmen in their own department; they keep the department up to the full standard and as they are paid by piece work they see that the outturn is kept up. Does the same system prevail here?—A. No. In certain departments of jute mills men are paid by piece work and in other departments on daily wages. It depends upon the class of work.

Q. The "sirdar" is also the head of the department for which he finds the labour?—A. Each department in a mill is so large that there are a number of sirdars in each department. There are head sirdars and under sirdars.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. You say the mills here work 13½ hours?—A. Yes.

Q. Under what Act?—A. Under the Factories Act.

Q. Continuous work for 13½ hours?—A. Yes.

Q. About the recess for meals, is that included or separate?—A. They work on a system of shifts which has to be approved of by the Factory Inspector.

Q. And the adult labour works for 13½ hours?—A. No. Adult labour cannot work for 13½ hours, because they have got intervals after every six hours. The majority work much less than 12 hours. The hours worked by adults, as a rule, would be about 9 or 9½ or 10 hours.

Hon'ble Pandit M. M. Malaviya.—Q. Are there any night schools attached to any of these factories?—A. There are night classes in Calcutta which have been run in connection with some engineering firms and the East Indian Railway.

Q. In none of the other factories?—A. No.

No. 17698, dated 12th December 1916.

From—The Agent and Chief Engineer, The Calcutta Electric Supply Corporation, Ltd.,
To—The President, Industrial Commission.

We have the honour to bring to your notice a public statement referring to our rates for the supply of energy, that was made before your Commission by Mr. R. P. Adams, Chief Inspector of Factories, Bengal, and to point out that the statement reading "the rates charged by the Electric Supply Corporation for small power users are so high that the factories have invariably considered it cheaper to install their own small steam plants" is incorrect, as the following figures will show.

During the last nine years the average yearly number of motors for small power users that have been connected up to our system amounted to 163 motors, varying in size from ½ H. P. to 300 H. P.

The total number of motors for small and large power users connected to our system at the end of 1915 amounted to 1,762, equivalent to a brake horse power of 12,373.

Special reference was made by Mr. Adams to oil and rice mills. Eight rice and nine oil mills have been connected to our system and the average amount paid by these consumers varies from 1·0 anna to 1·3 annas per unit.

The largest electrically driven rice mill installed in Calcutta gives every satisfaction, the owner, who started an electric drive in a small way at first has now adopted it throughout the whole of his mill.

Every year the demand for electrical energy for driving rice mills increases and the inaccuracy of the statement made by Mr. Adams is extremely misleading. We trust therefore that the above facts may be put before your Commission.

Large power consumers can obtain a rate of 4 anna per unit and we have several consumers whose rate works out below 5 anna per unit. This figure is a lower one, we understand, than can be obtained in Bombay where the supply is generated by water power.

NOTE.—Mr. R. P. Adams in returning the proof of his evidence informed the Commission that on account of urgent war work he is unable to submit at once figures in support of his statement. With reference to the supply of power to eight rice and nine oil mills, he stated

that there are at least 150 of these mills within the area covered by the Electric Supply Corporation. He also suggested the preparation of a statement showing :—

- (a) The name of the industry ;
- (b) Kind and amount of power used ;
- (c) The cost of maintenance for power used ; and
- (d) Whether under Indian or European management.

WITNESS No. 127.

THE HON'BLE DR. NIL RATAN SIRCAR, M. D., *Calcutta.*

*Hon. Dr. Nil
Ratan Sircar*

WRITTEN EVIDENCE.

The present industrial situation is one which calls for prompt action on the part of both the people and the Government. The question of India appropriating to herself some of the fields of industry covered so far by the industrial enterprise of Germany, as well as, that of utilising the favourable economic condition and the vast resources of raw materials of India for industrial development generally, cannot be satisfactorily solved by unaided private enterprise only. It calls not only for the maximum effort on the part of the people, but also for the closest co-operation between the people and the Government,—involving, wherever necessary, the need of Government organization and finance, as well as opportune legislative action. This should be done with necessary circumspection, and the lines of such co-operation and the precautions in the use of reserve powers of the State in aid of industry should be carefully thought out.

While such is the condition generally, there is in my mind an important distinction regarding industry, particularly on this side of India. There are enterprises started by Indians that are struggling on their way as best as they can. There are also enterprises begun by European initiative and conducted by European organisation in which there does not appear any lack of capital or any general short-comings regarding expert knowledge and management. I am interested primarily in the concerns started and run by Indians, and I shall attempt below to place before the Commission those difficulties which beset them. I also believe that the main object of this Commission is to find scope for the “development of the resources of India” through such struggling industries as are at the present time mostly in need of help and advice.

There is available in Bengal labour sufficient in quantity, cheap and teachable, and capable of being more and more efficient under economic pressure. The overseer and supervisors are also available, as also are, in some industries, even the trained scientific experts who require only business experience and knowledge of local materials and conditions to become competent guides.

The raw-materials are also there, lying unutilised or exported unworked to foreign countries ; an improvement in mining and agriculture will supply whatever finer staples or improved material may be required for successful competition. Private capital, though insufficient, is not entirely wanting, but is shy and cannot be easily attracted from safe and profitable investments in land towards industrial enterprises without some degree of encouragement. No doubt in Bengal we are somewhat lacking in business ability and instinct, but it is only after many costly failures, much trial and error that a people can expect to have in their midst captains of industry,—*entrepreneurs*,—able to create favourable conditions for commanding success. The crying evil in this as well as in other fields is that the people are without the power of initiative and without the power of joint action and organisation. It, therefore, behoves the Government, in order to focus all these favourable conditions towards industrial progress, to supply the organising power which in such circumstances is even more essential than labour power or power of machinery.

For success in industry it is necessary that there should be simultaneous combinations of certain conditions, *viz.* :

- (1) Sufficient capital with elastic banking for its proper distribution and use where needed.
- (2) Expert technical knowledge.
- (3) Commercial efficiency and knowledge of modern business methods.
- (4) Sufficient staying power and other conditions to enable industrialists to resist external competition.
- (5) Skilled and efficient labour.
- (6) Cheap transport facilities by land and water to meet trade demands.
- (7) Favourable market, internal and foreign, secured through industrial and commercial bureaus and other agencies, as well as through protective tariffs and export bounties and other facilities.

- (8) Location of industries in favourable sites, as regards raw materials, market, labour—supply and subsidiary industry, etc.
- (9) Supply of suitable and up-to-date machinery and raw materials, etc.
- (10) Plentiful supply of raw materials and accessories and chemicals.
- (11) Favourable climate and soil conditions.
- (12) Development amongst the people of group consciousness and of the capacity to act collectively.

Hitherto industries of various kind have, from time to time, been started here, but not always with a due regard to co-ordination of all the necessary factors involved. Technical education has been in some lines provided for, in the absence of capital and labour organisation, and factories have been started in some cases without requisite amount of capital or provision of experts.

Further, conditions of success are getting harder and harder every day; and it is to be apprehended that, after the war, the difficulties arising from foreign competition will become much greater and almost insuperable unless timely steps are taken to prevent them.

Amongst others, we in Bengal, labour under the following disadvantages:—

- (1) Our greatest drawback is the absence of sufficient capital at the right time and place. There is some amount of capital in the possession of upper and middle classes, but it is not easily available on account of the strong inducement offered by safe and profitable investments (direct and indirect) in permanently settled land or real property on the one hand and the want of confidence in our business capacity on the other.
- (2) The next drawback consists in the want of expert technical knowledge in some cases and of the capacity for business organisation in others.
- (3) The absence of cheap and adequate transport facilities by land and water is also crippling some of our industrial concerns.
- (4) Further, our industries are labouring under unaided and helpless competition with tariff-protected, subsidised and already flourishing industries of Japan, Germany and Austro-Hungary, the United States of America and some of the colonies of the British Empire.
- (5) I am not satisfied that everything has been done by the Government to secure for us favourable markets in reference to our raw materials and manufactures. There is no independent Consular service for India, and the Indian merchant—meaning a native of the country—is generally very ill-informed regarding everything outside his inherited routine business. Nor have the Government helped any industry to secure proper markets by encouraging marketing organisations and associations of Indian merchants. They have seen with equanimity, instead of resorting to interference, the destruction of much of the advantages of favourable market by the disastrous incidence of railway rates on raw materials and manufactured goods.

Of all the ways in which the Government can render material help to the growth of new industries in this country and particularly in this province, the most fruitful and far-reaching would be the supply of capital on easy terms on reasonable security. As regards these, it may be noted that there are important industries, for example, dye-stuffs, glass-wares, etc., for which we have most of the important raw materials, but which under the present conditions of competition require larger capital than private individuals here are in a position to invest, and joint-stock companies as yet do not command sufficient credit to raise the money.

There are several ways in which Government may help in this matter. I indicate a few below:—

- (1) Government may start pioneer factories in some of these lines in order to give a practical demonstration,—to enterprising industrialists who may be associated with the management of the industry—of their earning capacity as well as of processes and methods leading to success, and may afterwards cautiously and very gradually make over them to responsible organisations.

If necessary, Government may entrust the capital after the transfer to private parties by way of long term of loans.

If a State department is not conceived to be the best agency for lending out on industrial security, then it must be done through industrial banks lending out on such securities as industrialists can furnish. Such banks must supply the necessary money not only for meeting the requirements for ordinary working—the working capital—and for profit—increasing extensions from time to time but also for financing and purchase of machinery at the start.

It is a matter of common knowledge that in France and in Japan, State banks were originally found with the object, amongst others, of assisting industry and agriculture by supplying capital at a moderate charge to farmers and manufacturers on a reasonable security. For some time in India the project of a central State bank has been in the air; but nothing had been done in this direction as yet. A State bank should be established in India not only with the

object of carrying on currency operations but also of supplying, through industrial and agricultural banks, to the industry and agriculture of the country, necessary capital on reasonable security.

- (2) Government should also provide for the training in the technical institutions in India, as well as abroad, of the requisite number of technical experts for our present and future industries in various lines ; and should also impart to our people training in business organisation through commercial colleges, supplemented, wherever possible, by starting pioneer factories in certain selected industries.
- (3) Facilities for transport are necessary in much larger degree than are granted by existing railway administrations. Whatever may be decided regarding the policy of the State working the railways in India, there can be no doubt that the control over freight should be assumed and vigorously exercised by the Government in public interest.

As far as possible, in those provinces where conditions are favourable, water-ways should be opened in order to provide for trade cheap and easy transport.

- (4) It is, however, obvious that no amount of activity by the Government in the direction indicated above will in itself secure progress and success for our nascent industries for a considerable period of time at least, unless they are secured against dumping invasions from old and aggressive industrial rivals. The only effective method of securing reasonable conditions of success for industries growing under numerous disadvantages seems to be protecting them behind tariff walls. The various difficulties regarding protective tariff suggested by advocates of the present laissez-faire system do not do away with the need, under special conditions, of this form of State interference with private enterprise, but only argue the desirability of extreme caution. And the fact that, in any determination of the tariff problem, political considerations are involved would only affect the details of the tariff schedule as it would affect enemy countries, other countries, British Colonies and the United Kingdom. But a measure in the demand of which Indian public opinion is apparently very insistent and unanimous cannot be long put off. It is to be feared that there will be a tendency in the public mind in India to undervalue such active steps for the encouragements of industry as the Government may take at the close of this inquiry so long as the State has not shown courage to meet this demand.

I may mention that the same opinion is shared by many concerned in British industries, as will appear from the report of the Advisory Committee to the Board of Trade on Commercial Intelligence recently published.

Q.—(a) It is to be hoped that some portion of the large incomes along with unearned Capital increments derived by the land-owning classes from land, under the existing land revenue system, should be invested in industrial concerns, particularly in such industries as would lead to the improvement of land or improving the raw produce from land, thus raising the price of the produce and consequently the rental value of the land. This would expedite the improvement in the condition of the cultivators ; and all these measures, and the use of their saving for productive purposes, would in the long run increase greatly the wealth and prosperity of the landed classes themselves.

The Government may easily encourage the due discharge of such legitimate responsibility by the distribution of titles and honours. They may provide such machinery through the Director of Industries or through industrial banks as would tap these savings without putting too severe a strain on either the intelligence or the patriotism of the land-owning classes.

(b) The savings of the middle classes, including those in the Government and private service, and the professional classes may be drawn towards industries by the Government sympathetically co-operating in one or other of the ways mentioned below, which will inevitably create in the public mind the requisite confidence in our industrial concerns.

(c) The savings of the cultivating and the labouring classes in Bengal, except in the jute producing districts, are slender, as the bulk of them are living on the margin of poverty, and even the jute districts are mostly in the grip of grabbing usurers. But such as they are, they can be utilised for industrial purposes by means of co-operative societies, particularly those whose object is production as well as sale and purchase.

(d) But the amount of capital thus available from all these sources may not be enough for some time for developing all our sources in raw materials, labour and natural advantages in the province. For this reason indigenous industries must look to such additional capital as can, without any undue risk, be placed at their disposal by the Government. Further drafts must be made on other provinces of India and on Great Britain. It is gratifying to find that the savings of British enterprises in India are available for new ventures. We may hope that even when the fields yielding high speculative profits are covered up—a stage which we may regard as having been already reached—these sources will not dry up.

Further, to anticipate at this place part of the answer to the question of Government aid to industry, it must be said that with Great Britain unable to provide us with cheap capital

on favourable terms as in the past, we shall be thrown on our own resources in this country. And even after the mobilisation of available capital from the sources indicated above, there will be considerable deficit in order to cope with the needs of industrial progress for a generation or two. In what manner the Government can help is a larger problem of finance; but in my humble opinion, some part at least of the large non-tax revenue, from commercial undertakings which the Government is getting, should be laid aside year by year for helping industry by way of capital. Whether such money should be lent out directly or through industrial banks is a question merely of machinery. But the need of appropriating a part of the sum (the payment of which is not in the nature of a great burden on the people) for this purpose is imperative.

Government assistance.

Q. 5.—(1) I am against money grants-in-aid, except under very special circumstances (e.g., for effecting improvements processes, the benefit of which may be in due course shared by the public). Government action in this direction, however careful they may be, is likely to give rise to much criticism.

(2) Bounties and subsidies are necessary at times in order to provide against dumping and other unwelcome devices by foreigners. Such assistance may also be particularly necessary in developing the export trade, as for instance in the case of Bengal silk, when the industry is struggling under serious difficulties.

(3) Guaranteed dividends for a limited period would be one of the suitable forms of aid to new organisations. Such help by creating public confidence would facilitate the influx of capital. This form of help is particularly necessary in those industries in which a large capital is required and which on account of difficulty of market or such difficulties as the Government alone can solve no private industrialists are likely to venture upon. There may also be cases suitable for this form of assistance in the hand-loom industry and other handicrafts where private agencies would feel diffident to start on account of a general want of confidence in the prospects, though the products are so useful and artistic. In many cases Government will not have to pay anything; but any sum actually drawn from Government should be eventually recovered in easy instalments.

(4) In a province like Bengal, short as well as long time loans of public money to industrial concerns are a necessity. Such loans should be made repayable by instalments. Such loans should be ordinarily negotiated through industrial departments of State banks when started or State aided industrial banks on favourable inspection reports by Government experts.

(5) Machinery should be supplied on the hire-purchase system to cottage industries as well as to factory industries. In the case of cottage industries there should be demonstrations of the use of tools and appliances. In the case of factory industries, such machineries should be purchased only on the report of experts testifying as to their efficiency and up-to-date character as well as their suitability to Indian conditions.

(6) Government should subscribe portions of the share capital in case of new industries whose success, according to expert report, is not doubtful, but which the Government is not prepared to start as pioneers. In such cases there should be Government representatives on the directorate.

(7) Government should guarantee the purchase of product of new industries for a limited period, whenever these industries produce anything required by them in the way of stores in any of their department or in the railways. This will increase the staying power of the industries against competition. The price of the products may either be the market price at the time of purchase or calculated on the cost of production.

Q. 6.—In any case there should not be any Government control apart from inspection and auditing of accounts.

Pioneer factories.

Q. 7.—I would suggest the following industries to be pioneered by the Government in Bengal :—

(1) As key industries—

(a) Alkali (caustic soda, soda ash, soda crystal).

(b) Coal distillation and production of some ordinary coal-tar products, such as carbolic acid, creosote, naphthalin, toluene, benzine, aniline and if possible some coal tar dyes.

(c) Chrome salts.

(d) Tannin extracts.

(e) Non-combustible celluloid.

(2) As independent industries—

(a) Sugar refining (from date palm).

(b) Glass.

(3) A model mechanical and electrical workshop for making and repairing machinery.

Most of the conditions for developing these industries are favourable in Bengal. But most of them require large capital and highly experienced experts. Private enterprise is not likely to start them soon, unless profit becomes certain. When successful from a

business point of view, they may be gradually and with usual precautions made over to private parties. The most important precaution being, that there should be an intermediate stage at which the management should be joint, when those who aspire to take over the industry may acquire experience by associating themselves with good experts and business managers. The workshop should be a permanent institution, and the others should be handed over to private parties.

Q. 11.—Co-operative credit societies for production as well as sale and purchase would be of enormous help to develop many of the cottage industries. Productive societies would help in joint use of many machines, such as hand-looms, cane pressing machine, ploughing machines, etc., and in distributing them among members at reduced rates or among non-members at reasonable rates. Co-operative societies.

Sale and purchase societies should, where successful, dispense with the services of middlemen, and all their profits, which are occasionally very high, should go direct to the producers themselves. Without such organisations the producers who have no staying power are entirely at the mercy of the middlemen. The Government should take the lead in this matter. In the case of small industries, co-operation seems to be a necessity. There should be Government help and guidance, but the organisations should be mainly popular.

Q. 14.—So far as I know, the splendid industries in Germany, Japan and America have been developed and are still being developed by Government help, direct and indirect (*e.g.*, by bounties, subsidies and tariff-protection). It is impossible for any industry within British India, which happens to be in competition with any of the above, to grow without Government aid. I believe there is a strong body of opinion in Great Britain at present in favour of such help. Limits of Government assistance.

Q.—20. Demonstration factories should be started in Bengal, for demonstrating the use of improved tools and appliances as well as improved methods of production, chiefly in the case of cottage industries like weaving and also agriculture and agricultural industries. Demonstration factories.

Q. 22.—I do not think there is any necessity for research in the United Kingdom. Research abroad.

Q. 25.—Certainly, as for instance economic geological survey, economic botanical survey and analytical survey of soil in reference to crops. Industrial surveys.

Q. 34.—There should be trade representatives for India in foreign countries independent of the British Consular service. Assistance in marketing products.

Q. 37.—Government departments should publish lists of imported articles used by them.

Q. 38.—At present preference is given to Indian products only if they are on a footing of equality with foreign-made articles, whereas it is desirable that Indian products should have preference if they can just satisfy Government requirements and if their purchase does not entail extra expenditure.

Q. 39.—Generally speaking, most Indian industries on this side of India are suffering for want of banking facilities. We have many joint-stock banks besides the Presidency Bank. But the quality and quantity of securities that may be offered by the industries under Indian management—which are usually struggling under various difficulties—do not meet with the approval of the existing banks, particularly as there are a large number of efficiently managed big industries under European management as their customers. Banks that are mainly investing bodies are bound to look to existing conditions from the investor's point of view. But the view-point of the Government must be different. The Governments in progressive countries like America, France and Japan, etc., are in perfect co-operation and sympathy with the industries and have taken the full share of responsibility in the matter of their development: amongst other things, they have organised ample easy banking facilities for their growing industries and trade. It is to be desired that the Government here, in seeking to make the people industrially efficient and prosperous, will organise similar easy facilities for nascent industries by starting central State banks with industrial branches in industrial centres, as well as assisting joint-stock industrial banking corporations. Banking facilities.

As regards joint-stock industrial banks they will not succeed in India unless they have the power to issue bonds guaranteed by the Government or unless some portion of the funds in the State treasury is made available to them for a long period. Such concerns, run either as branches of State banks or as private corporations assisted by the Government, are sure to draw a large portion of the savings of the upper and the middle classes (including the *mahajans* and traders) and thus divert them to industrial enterprises. Such banks should also, it is expected, form proper channels for investment of surplus British capital in India in a larger measure. The expected facilities are (a) long time loans repayable in instalments, (b) cheaper rate of interest and discount, (c) fairer and less stringent valuation of such securities as industries can offer against loans.

I may be permitted to state that the absence of banking facilities is the most serious difficulty in the path of indigenous Bengal industries. It is possible for Government to remove this difficulty.

Q. 41.—In Bengal it is not easy under the existing land revenue system to secure large plots of land for industries, particularly those that are agricultural, *e.g.*, sugar, tobacco, fibres, etc. Further, industries like cattle-breeding and dairy-farming cannot be developed unless there are large areas of land at the disposal of the concern. Land policy.

Remedies.—(1) Greater facilities should be provided by legislation for the acquisition or leasing of land for factories and agricultural and other industrial concerns. Government should lease out land to tea and other industries on very favourable terms and without much restriction.

(2) All increments of value of land resulting from the industry of enterprising men, in agriculture as well as in manufacture, should be secured to the industries concerned.

Training of labour.

Q. 45.—The efficiency of all labour depends upon primary general education, which should be made available for every child of school-going age. With regard to labour of all grades, it may be said that primary education in school would give not only literacy but regularity, neatness, and certain amount of mental elasticity,—all of which would react very favourably on the efficiency of labour. At all events, immediate steps should be taken to put every child in an industrial area into a school.

(1) There should be training of the eye and of the hand (through object-lessons and manual work) for every boy in the primary school.

(2) Those who will be called upon to help or undertake agriculture or in industries dealing with curing of raw materials, must be trained in field schools and demonstration farms before taking up cultivation.

(3) Amongst the industries those that are purely handicrafts should have their men trained in lower grade industrial school in every district and also through apprenticeship in workshops or demonstration factories (where there are opportunities for training in the use of modern tools and appliances).

(4) As regards factories, labourers should be trained by apprenticeship in workshops as well as in the schools which latter seem more important in the case of employes in scientific and chemical industries.

(5) Secondary education will have to be largely remodelled and fitted to meet the requirements of industrial life.

Training of super-
vision.

Q. 51.—I suggest the starting of technological institutes in some respects on the same lines as that recommended by the Kuchler Committee some years ago. There should be one in Calcutta for the present as far as Bengal is concerned. This institution should be fully equipped for teaching different branches of engineering as well as chemical industries. For this province there is particular need of good provision for training in mechanical and electrical mining, railway, civil and boat-building engineering, leather tanning, some branches of textile industries, dyeing, sugar refining, tea making, soap boiling, ceramics, forestry, paper making, industrial chemistry, agricultural chemistry, botany and bacteriology and cattle farming. But no special stress need be laid on branches of work which will be adopted and added to in the light of experience. The existing Engineering College and the Sabour Agricultural School may be absorbed into it.

Such technological institute should be in close touch on the one hand with the actual industries of the country and on the other hand with the Universities. There should be good laboratories and workshops attached to this institute, but the students who have finished their first acquaintance with their branch may be enabled to complete their training by apprenticeship in the workshops, belonging to the Government dockyards, railways, tramways, electric corporation, port commissioners, the municipality, as well as in factories. On the other hand, those who have shown an aptitude for more advanced work should be allowed facilities to join the Universities or to go abroad. In some cases, some of these advance students may prove able and willing to do research work. To students picked out carefully, the research department of the Universities should open their doors.

The proposed institute should be under the management of a Committee on which the Departments of Education and Commerce and Industry should be represented. There should also be in the Committee some educationists and some members of the science and engineering faculties of the University and some Indian gentlemen who are actively interested in industries.

When agricultural, commercial, and technological faculties are established at the University, the higher departments of the technological institute may be affiliated to them. Such an arrangement will draw a very large number of students and divert education into channels leading towards commercial and industrial development.

Research work.

Q. 71.—Industrial research work cannot be done in this country by private agencies in any large measure because they always want quick results, whereas the benefit of research cannot be had in a day. The only proper institution from which dependable research work can be expected and has emanated in all countries is the University. University work in this country is still not well developed, and much remains to be done by the establishment of the faculties of commerce, agriculture and technology to bring our Universities into line with modern Western Universities. The greatest drawback, however, is with regard to facilities for research. It is refreshing to find that in Calcutta we have now a science college endowed for this object. Very much still remains to be done both with regard to this institution well as others which must come. The mere establishment of these institutions will not help us, unless they are in close touch with industry and are really able to solve those problems which present difficulties to practical men. Scientific research and technological research have

great mutual bearing. The promotion of pure knowledge leads in the long run to the adaptation of such new knowledge for industrial purposes. But we need at the same time a technological research department at the University so that a persistent inquiry may be kept up in the possibilities of raw materials, bye-products, etc. For all these, a much more sympathetic and liberal attitude on the part of the State towards the effort of the University is required than what has obtained in the past. It is our hope that the University will supply this great need regarding the development of industries.

Further, it is desirable to start here, in addition to commercial schools for the training of assistants in connection with the technological institute, a University college of commerce for training of trade representatives, agents, correspondents, brokers, railway men, bankers, accountants, actuaries, statisticians, etc.

Regarding the organisation of the executive machinery for carrying out such measures for the encouragement of industry as may be decided upon, I have to suggest, in the first instance, that the Department of Industry should be separated from that of Commerce. At present a very large part of the activity of the Member for Commerce and Industry is devoted, and that rightly, to commercial topics. It would be an advantage to have a separate Member in the Viceregal Council in charge of Industry. Official
organisation.

The provincial machinery is more important because it would be in the provinces where all local problems will have to be studied and facts of industry valued, analysed and shifted. The Imperial Department will help in securing such legislation, financial aid, tariff reform, industrial banks, technical education, etc., which would be of uniform help and value to all provinces. But concrete problems which present difficulties to local industries should be dealt with by the provincial organisation.

In the provinces, in my opinion, there should be a very carefully devised machinery so that the beneficent effects of any measures initiated by the Government can reach the struggling Indian industrialists. There should be a Director of Industries in every province. He should be an able man with clear grasp of business conditions. But the greatest of all qualifications would be that he should have sympathy with the industrial efforts of the people. However able a man he may be, if he comes with the orthodox prejudice that India is fit for agricultural pursuits only and nothing better, and that all this desire for industry is sentimental, he will do no good whatsoever and may cause great bitterness. In order to ensure happy results, it is necessary to make the Director of Industries only an executive official and leave the power of initiative as well as of deliberations in the hands of a Board of Industries. This Board should be constituted in such a way that without being unduly large, it would have on it some of the best elements of technical and business ability in the province. In view of what I have said in paragraph 2 of this written statement, I think even at the risk of sacrificing what is generally regarded as 'efficiency' in official circles there should be a strong Indian majority on the Board, if it is to be hoped that the measures undertaken by the Government should carry confidence of the public and if misinformed criticism of beneficent State action is to be avoided. If two Assistant Directors, also members of the Board, are appointed and if both of them are capable Indians, there would be a further guarantee of the measures of the Government being fully appreciated by the public. There are patent reasons why in Bengal the constitution outlined above is specially necessary, because here we have no strong Indian public opinion so far as matters of commerce and industry are concerned.

There should be provincial bureaus under the Director for supplying information to the public through bulletins.

I am interested in soap-making and chrome tanning. Difficulties have arisen in the former on account of the scarcity of supply of alkalis and perfumes. It would be a great advantage to us as well as to many other industries if we could command a plentiful supply of caustic soda, but the industry (alkali industry) is not likely to be taken up by private parties for various reasons. It is, therefore, my suggestion that Government should pioneer this industry.

The large quantities of raw hides and skins as well as several kinds of tannin-containing barks and fruits that are available here make this country particularly suited to the tanning industry. There are two modern ways of tanning known as bark-tanning and chrome-tanning. Ordinarily, tanning by bark is a slow process but it can be very much expedited by employing tannin extracts instead of barks. As yet no organised attempt has been made to manufacture such extracts, although there are plenty of raw materials such as *Babul* bark, myrabolams, mangroves, whose extracts would prove most valuable to tanners and would give an impetus to the leather industry. Further, a thorough survey should be made for new tannin-containing barks, fruits and wood in our forests. Attempt should also be made to cultivate such foreign plants, as for instance, Sumach, Divi-divi, and Mimosa as have got a fair chance of thriving in India.

For the purpose of chrome-tanning the most essential things are chrome salts (bichromate of potash or soda, chrome alum) and boric acid, lactic acid and borax. An attempt should be made to manufacture these chemicals locally, particularly the chrome salts, for which ore is available in large quantities in many parts of British India.

But it is not merely in the raw materials for the tanning industry that Bengal is rich. My practical experience has convinced me that the Bengal *chamars* are not only highly

steady, regular and hard working, but intelligent enough to learn the working of complicated machinery very quickly.

We have got amongst us some proficient experts trained not only in India but in Great Britain and the Continent. From the variety of hides and skins available here, various sorts of leather,—from the stiff sole to the soft glove and chamois leather,—may be manufactured in this country. I may mention here that in the case of chrome tanning we require skins and hides of prime quality—preferably from slaughter houses. We have to work under a serious handicap on account of the undue fluctuation in their prices caused by the control of this market being in the hands of foreign buyers.

Chrome tanners in Bengal would be much benefited if something could be done to ensure to them a steady supply of such hides and skins as they require from the various slaughter houses. The situation presents a clear case for *restriction, by the State, of exports of hides and skins*, particularly of such as are suitable for chrome tannage.

The tanning industry stands in need of another class of chemicals, namely, coal tar dye-stuffs, whose supply has been practically cut since the beginning of the War. Bengal tanners are helping themselves as best as they can with some vegetable dyes. But years of neglect and pressure of competition with coal tar dyes have almost brought about an extinction of the manufacture of vegetable dye-stuffs. The chances of their revival are also very remote. The best thing under the circumstances would be to try to prepare coal tar dyes in India; and until this is accomplished, facilities should be given to import into India such dye-stuffs as are being manufactured by the British Dyes Limited recently started in England. I would also have the attention of the authorities directed to bad flaying and bad curing of hide and skins which deteriorate very much in value under bad handling.

In my opinion the following new industries are likely to be successful in this country :—

Cottage industry :—

Brush making.
Lace making.
Making of hand bags and purses.
Sock knitting.
Wicker work.

Making of wooden and earthenware toys and dolls.
Carboard boxes and cases.
Button making (mother of pearl).
Walking stick making.
Making of handles for sticks, umbrellas, etc.
Ratan and bamboo furniture making.
Making artificial linen flowers.

Factory industry :—

Refining date sugar.
Glass making.
Distillation of wood.
Distillation of coal.
Distillation of coal tar, as obtained from iron and other factories.
Alcohol, from potato, sweet potato and molasses.

Galvanised iron sheet.
Brass and copper sheet making.
Pipe making (iron, brass and copper).

Sheet metal stamping.
Birchromate of potash.
Bleaching powder.
Alum.
Alkalis.
Boric acid.
Borax.
Celluloid—non-combustible.
Enamelled ironwares.
Fish preserving.
Match manufacture.

In conclusion, I should like to point out that so far as Bengal is concerned the desire for new industries and new channels for engaging the energies of the people is not due to any sentimental or patriotic aspirations only. There is a genuine economic pressure rendering the continuance of old prosperous conditions in agriculture impossible for the future. The advantage arising from the adventitious rise in the price of jute may have obscured the fact during the last decade. But steadily the difficulties are growing. The population of Bengal has increased and the available area of cultivable waste (almost six million acres) is shrinking every day. The distress resulting from pressure of population on the available resources is to be seen from the prevailing very high rates of interest and from the actual condition of the poorer and middle class people. The cultivators and their farm labourers seldom manage to rise above the margin of poverty on account of the grip of the *mahajans* and the buying agents upon them. The much-vaunted agricultural prosperity of Bengal does not always bring much money into the pockets of the cultivators and their dependents. These are, in

Bengal, out of a population of about 45 millions, roughly 35 millions. The rest, with the exception of a small part, who are engaged in trade, and profession and Government service, are mostly middle class people in search of work. The acute conditions for the search of livelihood of a large body of middle class people are patent to all. While agriculture no longer offers scope to all the classes of the population of Bengal, the finding of new avenues for them is no longer a dictum suggested by mere sentimental patriotism or the mere benevolence of a paternal Government, but by grim realities of the situation.

ORAL EVIDENCE, 9TH DECEMBER 1916.

President.—*Q.* Your note is very full and I suppose most of us will probably agree with a large part of it and I expect that all of us will admit that the whole of it is stated very clearly. There is only one point that I should like to hear your extended views on and that is with reference to question 71. You say that the only proper institution from which research work can be expected and has emanated in all countries is the University. By that you mean also of course colleges of University rank. It is just possible that in this country the conditions are slightly different and as you know a great deal of research work done in this country has come from institutions that are not universities, namely from the Government scientific departments established for the purpose. Now would it not be better if we concentrated our organising efforts towards developing research work in the University mainly with a view to keep that research work on the side of pure science, not of course neglecting results that are of industrial value. The point that I am trying to get at is this, that it is difficult in the University, either here or anywhere, to carry your research work beyond the stage of scientific work into the stage of industrial application, because that requires experimental work on a large scale and it would require also a knowledge of market conditions of a kind not generally known to the University professor. Consequently would it not be better to develop scientific and technical departments of Government in India with a view to passing beyond the stage of research work in pure science to industrial development? Government departments would then, through their specialists, get into touch with commercial people and by its knowledge of Government rules and regulations would be able to assist and foster the application of results?—*A.* I do not see that it would not be feasible for the Universities to associate themselves with research work. And if the Universities be not reconstructed with this idea they will very soon lose touch with the real life of the people. I do not say that at present the universities are fit to take up such work but they will have to be reconstructed on those lines. I was making a list of the universities in the English speaking world and I find that out of 19 Universities there are only 3 or 4 at present which have nothing to do with commercial or technical education and those are such universities, as the Classical University of Oxford and the University of Dublin. It appears that throughout the world there has developed a desire to associate university training with technical and commercial knowledge.

Q. You would like to see the Universities develop the teaching of technology and commercial subjects and go further and develop research facilities?—*A.* That is one branch of it. The two things are quite inseparable. I would not throw the burden of research on those who are engaged in teaching. Of course the research professor may deliver only a course of lectures as to the results of his discoveries from time to time, but the research workers should be associated with the University. As regards the present institutions, such as the Agricultural Institute at Pusa or the Geological Survey Department or the Botanical Department, who are actually making research work they all should co-operate in the matter of training students as so many departments under the Universities.

Do you mean to say that a department like the Geological Department should be a sub-department under the University?—*A.* The research portion of it should be the training institution for University students.

Q. The whole of it is research?—*A.* It may be looked upon as the University faculty for research in geology.

Q. I do not see why it should be attached in any way to the University except that the officers of the department could lend all help to the University? You do not mean to say that you would put the Geological Department under the control of the University?—*A.* I do not mean exactly control. I mean some connection by which greater co-operation would be possible.

Q. In the case of a department like the Geological Department would it be possible for an officer of the department to be a teacher of the University?—*A.* Yes. In order to make teaching a living thing the University must find as teachers men actually engaged in research work in the Department and students must have the privilege of being trained in contact with such workers.

Q. That is the system that was adopted in my time?—*A.* We are all grateful for the introduction of the system.

Q. The professors of geology were members of the Geological Survey, and not only University students, but those who came from Native States, were trained also under that system in the Geological Survey office.—*A.* You mean to say that you would like that extended to the other scientific departments?—*A.* The students of the Universities should have opportunities of making research work under the departments in touch with the best workers.

Q. You mean that they should be deputed to the department for making research?—A. Yes.

Q. Then you say as a practical proposal that these scientific departments of the Government of India or of the local Governments should be encouraged to accept students from the Universities for training in research problems; and, conversely, officers of the scientific departments would be expected to take part in the teaching work of the University?—A. Yes and the Universities should also recognise and publish the work of their own students carried out under the guidance of the officers of these departments.

Q. These results would be more appropriately published by the department itself?—A. If the students get that opportunity and privilege so much the better. I am rather a little diffident about that. It would be asking the department too much.

Q. I see no difficulty?—A. As a member of the University I shall be extremely grateful if that could be done. The students would be on quite a peculiar footing. They would be neither officers nor apprentices.

Non-members of the Geological Survey have published papers in the Geological Survey Records. There are no reasons why they should not be published by the department.

Sir F. H. Stewart.—Q. Do you think that at present labour is available in Bengal for industrial purposes?—A. That depends on the industry. There are some industries for which labour is available and there are certain other industries for which labour is not available. When I wrote my note I did not mean that it should be taken as a general proposition.

Q. You think that labour could be found for the smaller industries?—A. That is my idea. I have felt no difficulty in my little concerns.

Q. With reference to your remarks about pioneer factories I gather that your opinion is that Government should be associated with the business management from the outset?—A. What I mean is this. Government should start the factories and have them managed by their own experts and business men.

Q. Whose business men?—A. Government should appoint competent men to manage the business side. The business side as well should be managed by Government officers. Such officers should have business training and should see that the concern becomes successful. Private parties who intend to take up a factory should be associated with the Government management for sometime as otherwise they are sure to fail. The question of association comes in here. When a factory has proved successful, Government may hand it over to private enterprise.

Q. With regard to your remarks against usury is it your idea that side by side with the development of co-operative systems for industrial purposes there should be legislation against usury?—A. I should be the strongest advocate of legislation against usury. I find that many of the cultivators in the mofussil are entirely in the grip of money-lenders. After working hard for a whole year the cultivator finds his debt much increased at the end of the year.

Q. You want then to provide some means by which they can be free from the clutches of the usurers?—A. Yes, at present the co-operative societies can replace the mahajan only to a partial extent and therefore the mahajan will remain a necessity for a long time to come. That is more the reason why Government should suppress usury by all possible means.

Q. You then say that some part at least of the non-tax revenue should be available for commercial undertakings? What do you mean?—A. It is only a suggestion and you may take it for what it is worth. The railway is one, irrigation is another, the post office is a third and the telegraph a fourth. The revenue in these departments come directly or indirectly from commercial sources; and I think a portion of these revenue should be devoted to the development of industries.

Q. You recommend that certain industries might be taken up and you mention glass. Do you think Bengal is suitable for glass manufacture?—A. Yes, I believe Bengal is a suitable place for this industry. Of course there might be small difficulties: but they could be got over.

Q. What about raw material?—A. I once heard in the Bengal Legislative Council that there was no good sand here: but I am now satisfied that there is very good sand suitable for manufacturing glass available in Bengal. Samples were sent to chemists and they pronounced them to be very good.

Q. And about labour?—A. I believe it is possible to organize labour for this purpose in Bengal. Labourers will require some training. This is the case with any kind of industry. But suppose we don't get the proper kind of labourers in this province; we can get them from some other provinces. What does it matter? We need not be self-contained in every matter.

Q. With reference to your suggestion about the organisation of a provincial department of industries, do you mean that the Director should be the servant of the Board?—A. I can illustrate my meaning by an example. The Municipal Commissioner of Bombay is not exactly a servant of the Municipality. I mean the same sort of relation between the Director and the Board.

Q. Would you give the Board executive functions?—A. The Director will be the executive officer of the Board; but I want to throw greater responsibility on the Board. Very often, the Board will be a non-entity if it is not given some responsible duties.

Q. About Assistant Directors do you think you could get competent Indians?—A. I can think of competent Indians who can take up the post.

Q. The whole trend of your evidence shows that Bengal is particularly weak in the matter of industries and you want to develop them?—A. My attitude is one of encouragement, and there is another thing which I want to make clear. Here in Bengal we are much more advanced politically than industrially. The Government has to convince the people of their (Government's) good intentions and earnestness in the matter of industrial development. If the people become suspicious about this movement it cannot do any good. They begin to entertain all sorts of feelings of irritation. That has to be provided against.

Q. You have referred to chrome tanning. May I ask you if you have interested yourself personally in the matter?—A. Yes, but I manage it through a competent manager.

Q. You are making a profit?—A. I am making some profit. I shall explain what I mean. In the earlier days it was not a success. Now I am making a profit.

Q. Is it conducted on business lines? Are you having your accounts audited?—A. Yes, there are accountants who keep regular accounts on strict business lines.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. Have you had any railway difficulties in regard to your business? Do you think that if the railway freights are properly reduced then trade will advance?—The freight is very heavy so far as my business is concerned. For instance I have a small concern in soaps. There is a very large market in Darjeeling but the freight is prohibitive. We have to add from 25 to 30 per cent. to the value of the ordinary goods.

Q. Have you got any scheme in regard to the industrial bank? Do you think that if the bank is supported by Government then people will subscribe?—A. Yes.

Q. They ought to lend money for long periods?—A. Yes, that is the main object.

Q. You said that some portion of the non-tax revenues should be devoted to industrial undertakings and you instanced the earning of railways. Don't you think that the income earned by railways might be utilised in extending railways and thereby helping the people?—A. If one is to be put against the other that is railway *versus* industries, I think that railways should not outrun industries. Whereas the railways kill the handicrafts they do not bring any advantage to places where there are no industries. Speaking from the industrial point of view railways would be the means and industries would be the end.

Q. The railway earnings are generally from raw material. Don't you think that in place of that if there were something like the excise duty in the case of industries that would be much more justifiable?—A. I should think so. This will certainly be a justifiable source of income. But apart from that railways are constructed out of funds raised from loans and there is a saving of 7 to 8 crores every year from this source and another 9 crores from irrigation. What I mean is that some portion of this amount should be utilised for the development of industries.

Q. We have heard many witnesses say that the banks here do not advance money in the case of good securities, because the concerns are Indian. You in your statement say that the securities are not good securities and therefore the banks do not advance money?—A. I do not say they are not good securities. I believe they appear insufficient to the banks from this point of view.

Q. On account of their being of Indians?—A. The thing is there is a great deal of want of knowledge. The bank authorities do not know the Indian firms and the Indian industries and industrialists. That is the trouble.

Q. Then about the Board of Industries we have a system in Bombay by which we have some elected members and some nominated by Government and the Chambers of Commerce and the Mill Owners' Association? Do you want a system of that kind?—A. Yes. I would have it partly elected and partly nominated.

Q. You say that facilities should be given to import dyes from the British Dyes, Ltd.?—A. If I want 5 pounds of some brown or black dye-stuff I cannot get it unless I am a shareholder of the concern. It should be sold to tanners within the Empire at least.

Q. Do you think that they should give preference to those who are not shareholders? The shareholders ought to get the stuff first. Don't you think so?—A. There is difficulty in getting shares.

I got some shares a short time ago and you can have some and then you will get preference.

Sir D. J. Tata.—Q. We have had many complaints about railway freights. Nearly every industry complains that it is hampered by heavy railway freights. Now, do you realize that the railway companies have also to pay dividends to their shareholders? Of course the whole thing turns on the question whether the railways should be owned by the State or by companies?—A. I think so. But is it not a fact that in India all the railways are practically State railways?

Q. Only some. Not all.—A. My point is that those that do not belong to Government may be persuaded to deal with industries a little more leniently. I notice that sometimes the rates are unnecessarily enhanced.

Q. The Government of India have fixed maximum and minimum rates and the railway companies can only charge between those limits. You complain that wherever possible they charge the maximum?—A. Very often and certainly not the minimum in most cases. But they should charge the minimum for industries.

Q. Should there be any appeal to anybody?—A. Yes, to the Railway Board and at present it is very difficult to approach them.

Q. Unless there is State management how is this possible?—A. I am strongly for State management of railways as I am for State banks.

Q. What suggestions have you to make in this respect?—A. State interference in case if management by private companies or State management and to have a continuously sitting Railway Board to watch over the working of the railways.

Hon'ble Sir R. N. Mookerjee.—Q. With reference to your suggestions about the remodeling of the University courses, don't you think that you must begin at the bottom and, that is, improve your system of secondary education?—A. I am sorry there is that omission. I am strongly of opinion that the secondary education requires to be remodelled extensively so as to adopt it to the needs of industrial life.

Q. Under what department would you place the Director of Industries?—A. I have suggested that there should be an additional Member for Industries in the Government of India. In Bengal there is a talk of a fourth Member of Council. He might have the portfolio of Industries.

Q. You would recommend to create a fourth Member to take charge of Industries?—A. There is in the air a proposal of the appointment of a fourth Member. I would have a Member for Industries.

Q. You state that you are in favour of Government manufacturing machines? Have you any idea as to what it will cost Government to do this?—A. I do not mean all the machines. Only some ordinary but very useful ones. The cost should not be prohibitive.

Hon'ble Pandit M. M. Malaviya.—Q. You are definitely of opinion that the question of industrial development so far as Indians are concerned cannot be satisfactorily solved without Government aid?—A. Yes.

Q. And you therefore advocate the establishment of a State bank with an industrial side attached to it?—A. For my purposes it is not the State bank that is so much necessary as the industrial side of it. Whether there is a State bank or not I would have an industrial bank.

Q. How would you wish this industrial bank to help industries?—A. It may be either a joint stock industrial concern or it may be a branch of a State concern. The bank should have a staff of business experts as well as industrial experts and manufacturing experts, and on a favourable report from these experts the bank should advance money on loan. These loans should be fairly long time loans and the rate of interest should be fairly low; and the securities demanded should not be unreasonably high in value.

Q. On what security would these industrial banks advance loans to persons engaged in business?—A. On the security of land, if there be land, plant, machinery and stocks (that is raw material and manufactured article).

Q. If the industrial bank is a part of the State bank State help is assured. But suppose that the industrial bank is separated by itself, how would you wish the State to help?—A. (1) By guaranteeing a dividend, say of 5 per cent., and (2) by placing some additional capital in the hands of the bank for industrial purposes. These banks would not take deposits.

Q. You think that the public will then come forward to subscribe?—A. I am very hopeful about that.

Q. What is the advantage that you expect will result from the bank having connection with a State bank?—A. In the first place Government reserves may be used. I mean such portions of the paper currency reserve as may be available for industries; and as a matter of fact it has been recommended by expert opinion that a portion of these reserves ought to be invested in India.

Q. You are aware that at present a portion of the Government reserves is available for business purposes through the Bengal Bank and the Secretary of State in London?—A. 4 crores out of 37 crores may be invested here.

Q. You want merely an extension of the same rule to the industrial bank which you advocate?—A. Yes.

Q. And you think that if it is a part of a State bank the Government treasury will be able to replenish the bank in times of crisis?—A. Yes. The banks should always look for financial help from the Government.

Q. Are you aware of any similar system obtaining in any other country?—A. I think a similar system prevails in Japan and Germany and France also.

Q. You say that these banks should have business experts to advise them. In what way?—A. It is only on the reports of such experts that the bank should advance money.

Q. With regard to educational facilities you are of opinion that there should be provision for the technical training of persons who are to be engaged in industries from the workmen to the manager?—A. Yes, I think there should be provision in this country for all grades of technical training.

Q. You would begin with elementary education being made general and compulsory?—A. Elementary education appears to be an indispensable necessity for industrial development. We should therefore have a system of general compulsory and necessary free elementary education.

Q. You do not think that our workmen can compete with the workmen of other countries, such as England, France or America because in these countries the workmen have had nearly 8 years of compulsory education which must tell considerably in favour of them?—A. I know that there is a difference between a person who has no education and another who has a little education. It is remarkable, on the other hand, how creditably many of our workmen acquit themselves in spite of their illiteracy.

Q. With regard to technological institutes, you think that at least one central institute should be established in each province? Do you think that one for the whole country would suffice?—A. I do not think so. The technological institutes will have to impart training, not only in class rooms but also in business concerns and agricultural fields. There is a limit to the distance. Even in the same province the places concerned will be far apart. But on the whole I think there should be one in each of the Presidency and bigger provinces.

Q. If there is only one for the whole country, then students will not be drawn from the distant provinces?—A. One of the reasons stands on the disadvantages of distance. The next point is that greater interest in technological education may be created by the establishment of technological institutions in the different centres. What we have to do is to divert the present channel of education from literary and law courses towards courses for education in commerce and industry, and for that purpose we must have the technological college in the heart of the University; in the very place where there are the law college and the medical college and other colleges. Further proximity of colleges not only creates interest but maintains and develops it by facilities granted to those that are near.

Q. You don't advocate that students should be sent to England?—A. I am strongly for sending a large number of our best students to foreign countries for industrial and commercial training. But all cannot go to England. And not even many.

Q. You would then send the best of the boys to foreign countries to complete their education?—A. Yes.

Q. Would you send them abroad before they have had some preliminary experience?—A. That would depend on the line. Where there are facilities in India the students should take some preliminary training here before going abroad.

Q. You have spoken of the difficulty of railway freights and you are in favour of State railways?—A. Yes.

Q. You have mentioned that there are two rates—a maximum and a minimum rate. Is it not the case that the rates are fixed for a period of 25 years or more?—A. I don't know exactly.

Q. You think that so far as the freight is concerned the State is in a better position to consider what changes should be introduced and to make those changes than a railway company?—A. Certainly. The railway companies will only look to their own interest and not to that of their customers.

Q. And is there not some justification for that?—A. It is not unnatural. But if Government took it up, they would be able to look at the matter both from the industrial and business point of view; and the business side of railways would be subjected to the industrial interests of the country.

Q. You are strongly in favour of a University college of commerce here?—A. Yes.

Q. You are aware that proposals for such a college are under the consideration of the Calcutta University? Do you think they will satisfy your requirements or do you think that a college of commerce like the one at Bombay is necessary?—A. I have seen the curriculum of the Bombay college and so far as I can gather from the calendar the courses of study appear to be satisfactory. But I am not an expert in that matter. I would have a college of commerce, and as regards the details and the courses of study I would leave that to a body of experts.

Q. Do you think that if you receive from Government financial assistance and other encouragement in the shape of a purchase of goods, that will enable the industries to stand on their own legs or would any further assistance be still needed?—A. It would still be needed.

Q. You don't think that financial assistance from Government and a purchase of goods will afford sufficient protection against foreign competition?—A. That will depend on the industries. Some may stand competition with ordinary help. But there are others that must be protected. Take for example the silk industry. Government experts are constantly working in this connection. They have found out some diseases and also some remedies for them. Labourers are being trained. But even with our best efforts we cannot compete with foreign silk.

Q. You said that secondary education needs remodelling. Do you mean that you will have an industrial side by introducing elementary science and manual work throughout the secondary school course?—A. I should have manual training and practical lessons in forging, filing, chipping, turning, welding. I would also make drawing compulsory.

Q. At what age would you introduce drawing?—A. It should be commenced very early. Almost the time that the child begins to read. That is a question of training the muscles and it should be taken up at a very early stage.

THE HON'BLE MAHARAJAH SIR MANINDRA CHANDRA NANDY, of Kasimbazar.

WRITTEN EVIDENCE.

There is a large body of opinion in this country which seems to think that India is not fit for large industries and that conditions of life here lend themselves only to the development of small or cottage industries as in Japan and many other Asiatic countries. It appears to me that this opinion is wholly erroneous, and is not based on sufficient or correct data. The wonderful and phenomenal development of the jute industry in Bengal, of cotton in Bombay, of tea in Assam and coffee in the Nilgiris, give the lie direct to the statement that India is not fit for large industries. At the same time, there can be no doubt of the fact that there is wide room in India for the growth and development of such small industries as may go to meet the peculiar requirements of the Indian people without coming into competition with the manufacturing activity of the other portions of the civilised world.

Capital.

Government assistance.

Technical aid.

The two most serious difficulties in the way of the success of large industries in Bengal are the want of sufficient funds and the absence of expert knowledge. It is unfortunately true that the zamindars of Bengal do not at present give much attention and thought to industrial questions; and, thanks to the permanent settlement, even the people of the middle classes in Bengal are tempted to invest their savings and income in land rather than in joint-stock or industrial enterprises. I have been connected with various industrial concerns in Bengal for nearly 20 years, and I have no hesitation in stating that I have met with the greatest difficulty in raising capital for industrial enterprises or securing loans to finance them. Joint-stock industries being new in the country and many not having done well, mutual distrust and want of confidence seem to be the prevailing difficulties in Bengal. Under the circumstance, I think the Government ought to come to the rescue of the people by helping nascent and struggling industries with either long-term loans of money on merely nominal interest or some sort of subsidy or bounty or guaranteed interest as exist in case of railways. The Government, I think, should also come forward to give expert guidance, free of all charge, to such industries as stand in need of them. With this view, I should like the Government to encourage the study of applied mechanics and science and establish research laboratories all over the country for the examination of all agricultural, fishing, and mineral resources. I think no provision of research work in the United Kingdom for any special subject is likely to do any good to our industries.

Financing agencies.

If the Government cannot see its way to grant any sort of direct bounty or subsidy to any Indian industry, I should like the establishment of some central State banks where joint-stock companies may find easy loans on reasonable terms. At present, it is not easy for Indian industrial concerns to get any loans from presidency or other banks, though money may be secured on personal securities. So long as Indian capital, particularly in Bengal, will continue to fight shy of industrial enterprises and loans are difficult to secure from any bank, Government should step into the breach and do its duty to the people in offering ample facilities for the proper organisation and financing of all important and responsible concerns. As for small cottage industries, they may be established and developed with the help of the co-operative banks, which are now spreading so fast all over the country. At present the function of the co-operative banks is confined principally to advances to the agricultural population for the purchase of seed and cattle and to meet emergent agrarian situations, but there can be no doubt that these banks could be made much more popular and useful if their function could be extended to the purpose I have just indicated.

Cottage industries.

In the case of cottage industries, the hire-purchase system should be introduced for the indent of all machinery, tools and appliances. There should also be occasional demonstrations by experts of the use of machinery and appliances in selected localities and also to show improved methods of production. For these purposes, annual industrial exhibitions should be encouraged wherever possible.

Pioneer and demonstration factories.

In this connection, I would like to urge the Government to open in Bengal some pioneer industries and demonstration factories. The glass industry, porcelain, tanning, celluloid, sugar-refining and fruit-preserving might very profitably be pioneered in this province. At a place like Rangpur, a demonstration factory might be started by Government for the curing of tobacco and manufacture of cigars and cigarettes and, at Berhampore, a similar factory for silk would undoubtedly prove to be most useful object-lesson in industrial development. I should also like the Government to carry out an economic survey of all the raw materials available in India for industrial purposes.

Government patronage.

As regards the produce of the large factories and industries, I should very much like Government to purchase as much of them as is possible. I am afraid Government does not yet go whole-heartedly for all indigenous manufactures, though many circulars have been issued from time to time for the purchase by all departments of the State of as much of indigenous goods as are wanted by them.

Technical education.

Next to finding money for the industries and a ready market for their produce, I think the most crying need of our people is expert knowledge. In Bengal, there is a particular dearth of such knowledge; and to remedy it, I would suggest the establishment of a large technological and agricultural college as well as a college of commerce in connection

with the University of Calcutta, besides a large number of industrial and technical schools of second grade placed under the control of a Department of Industries. I am of opinion that the scope of the University of Calcutta might be most usefully extended if an agricultural, an industrial and a commercial faculty could be added to it. The University college of commerce should train young men to equip themselves as trade representatives, bankers, accountants, actuaries, etc.

There is no provincial Board of Industries in Bengal or a Director of Industries either. Both these are badly needed in Bengal. The Board should consist only of business men and the Director must be an expert. The agricultural school and research institute at Sabour (near Bhagalpore) is also capable of much improvement and should be made attractive to higher classes of students. If the school could be raised to the status of a college and affiliated to the University, its degrees would attract large number of students from the upper middle classes.

River transit, the cheapest and the most popular means of carrying goods, is now getting impossible, as many of the waterways are practically silted up and are not navigable for the greater part of the year. The Bhagirathi near Berhampore, the Buriganga and the Dhaleswari in Dacca, the Brahmaputra near Mymensingh, the Bhairab and the Kapotakha in Jessore, and the Nadia rivers need to be opened up for navigation throughout the year. The following railway lines are also badly wanted in Bengal :—

1. Between Dacca and Aircha (opposite Goalundo).
2. Between Mymensingh and Aircha *via* Tangail.
3. Between Natore and Godagari *via* Rajshahi.
4. Between Bhanga and Faridpore.
5. Between Khulna and Barisal.
6. Between Comilla and Daudkandi.
7. Between Kalimpong Road to Kalimpong and Chumbi valley.
8. Between Gauhati and Shillong.
9. Between Rampore Hat *via* Kandi and Poradaha.

ORAL EVIDENCE, 11TH DECEMBER 1916.

Mr. C. E. Low.—*Q.* Under the head of "Pioneer and demonstration factories" you suggest the establishment of a demonstration factory for the curing of tobacco and the manufacture of cigars and cigarettes at Rangpur. You are no doubt aware that there is a very large and up-to-date tobacco and cigarette factory in Monghyr, which is no doubt far more efficient than anything that Government could start as a demonstration factory. How do you think that a demonstration factory would help you, when the large private factory at Monghyr has not had any effect in inducing people to come forward? Do the Monghyr people allow visitors to look at the working at the factory?—*A.* I am not aware whether there is any college at Monghyr. In Rangpur a college is to be established very soon, and I hope that the students will take a great interest in all these affairs, and for the students who pass from the college it will be very easy to go and learn the business at Rangpur.

Q. Do you think that the students are the people who are most likely to start a tobacco factory if they saw a demonstration factory working?—*A.* I did not mean that the students were to start the factories, but if the tobacco factory is placed there, and the school be close to the factory, the students will go and learn the trade.

Hon'ble Pandit M. M. Malaviya.—*Q.* But the question asked by Mr. Low was, that as there is a good up-to-date tobacco factory in Rangpur, why is it necessary to start another demonstration factory; do not the Monghyr factory people admit students or anybody to their factory?—*A.* I don't know whether the Monghyr factory people admit students or anybody.

Mr. C. E. Low.—*Q.* You suggest a Board of Industries and a Director of Industries in Bengal. You say the Board should consist only of business men. Would their functions be advisory, or would they have authority to overrule the Director of Industries?—*A.* Advisory only.

Q. Do you think that will meet the popular demand for a more democratic body?—*A.* Oh, yes.

Q. What do you mean by "business men" what type of men do you contemplate?—*A.* Business men who understand business.

Q. That is to say, you contemplate the kind of man being one whose advice you yourself would like to take if you were going to start any business?—*A.* Yes.

Q. Many witnesses have said that, owing to the lack of experts and business advice, many of these swadeshi industries were failures?—*A.* Yes, because they did not get any help from anybody.

Q. And it is desirable, is it not, to make experts and business advice available?—*A.* Certainly.

Hon'ble Pandit M. M. Malaviya.—You have found much difficulty in raising capital for industries?—*A.* Yes, I found great difficulty in raising capital.

Q. Do you think that unless the Government comes forward to help, in some form or other Indian capital will not come forward for investment?—A. Yes, we beg the help of the Government. If they start a bank or give money as a loan on a long term.

Q. In some form or other you want Government assistance and encouragement?—A. Yes.

Q. Without that assistance you think that Indian capitalists will not come forward to invest much in business enterprise?—A. Yes, I think so.

Q. And you also want greater provision for teaching applied science?—A. Oh, yes; that is essentially necessary.

Q. You say that loans are difficult to secure in Bengal from anywhere, and that "it is not easy for Indian industrial concerns to get any loans from presidency or other banks, though money may be secured on personal securities"?—A. Yes.

Q. Have you yourself any knowledge of cases in which such help has been refused?—A. I have a little experience of it, but no direct experience. I tried to get a loan from our Bengal Bank for the Pottery Works, but that was done by my agent, so I am not aware of the particulars.

Q. But it is your impression that there are difficulties in obtaining help from the presidency banks?—A. Yes.

Q. You advocate the establishment of a central State bank?—A. Yes.

Q. Do you mean that that bank should take up business, for instance that part of the Government business which the presidency banks do at present, and do some other business also?—A. Yes, do some other business also; advance money to the industrial factories or concerns or anything else.

Q. Do you think that one central State bank will suffice for both?—A. Certainly not; there will be branches of it.

Q. You mean one central bank in every province?—A. Yes, with branches where necessary.

President.—Q. Would it not be better if, instead of using the words "every province," you say "a number of industrial banks in suitable areas," because you cannot expect a bank to coincide with exactness in each province, and there are some small provinces that would not maintain a bank under any circumstances. Your object would be served if the bank is formed in suitable areas?—A. Yes, in different parts of India.

Hon'ble Pandit M. M. Malaviya.—Q. You say that there is much dearth of expert knowledge in Bengal, and you suggest the establishment of a large technological and agricultural college; do you mean there should be two institutions, one a technological and the other an agricultural college?—A. Yes.

Q. And also a college of commerce?—A. Yes, because in India there is no such college from which our students can learn commerce and agriculture properly. Of course we have got at Pusa an Agricultural College, but it is in the nature of a school. We want a college where our students will be tempted to get degrees as an encouragement.

Q. What advantage do you expect from it; you want this college to train up men to apply scientific principles to agriculture?—A. Yes.

Q. Do you think many young men will be attracted to such a college?—A. Yes.

Q. Sons of zamindars also?—A. Yes.

Q. Does the school at Sabour attract such students?—A. At first it attracted some of the youths, but when they found later that after passing the examination there they did not get any Government posts I think they have discontinued to go there; but if there be a degree if that Sabour institute be a college, and a degree is conferred on successful students then I hope that there will be great attraction.

Q. What is the reason for it; is it that the degree will indicate a higher standard of knowledge?—A. A higher standard of knowledge.

Q. Then you want the standard of teaching there to be raised?—A. Yes.

President.—Q. Have you any precise knowledge of the standard now adopted at Sabour and the kind of students who go there; the number that go there and the number that there is now? Do you know the number of students attending there now and whether the number has fallen?—A. I have no information.

Q. I thought you said the number had fallen off; that the students had discontinued going there?—A. I heard it; but I don't know the number.

Q. Is it a fact that a few years back Mahomedans and zamindars' sons used to go there, but they have ceased to go there, because they found it to be no good?—A. They think that at present the teaching that is imparted there is not sufficiently good. They get lessons in agriculture, about ploughing only, and very little knowledge about sowing the grains, but the students who want to go there wish to learn scientifically everything, and they are not satisfied there.

Q. They are not satisfied with the standard of instruction that is imparted?—A. Yes.

Hon'ble Sir R. N. Mookerjee.—Q. At the beginning or now?—A. Now. At the beginning they had a college, and having no students, it was reduced to a school. Government

ought to consider that at the beginning there are very few boys who wish to go there, but if the Government waited for some time, the zamindars' sons and other students would have gone there.

Hon'ble Pandit M. M. Malaviya.—Q. You suggest that there is a necessity for adding several railway lines in Bengal, and you give a list of 9 such lines. Don't you think that private industrial enterprise is likely to come forward to take up some of these lines?—A. Oh, yes; there is every probability of private enterprise, but Europeans and not Indians will come forward.

Q. But there are some Indian firms who have taken up some of the branch lines in Bengal?—A. Yes.

Q. You don't expect that the number of such undertakings will increase in the future?—A. No.

President.—Q. What Indian firms have taken up branch line in Bengal?—A. I am not aware of those things; but there is the Tarkessur Railway, and the Martins have taken up making lines.

Hon'ble Sir R. N. Mookerjee.—Q. Indian firms only one or two, and European firms several?—A. Yes.

President.—Q. Is that not a fairly good test; if we have a railway project with guaranteed terms, that Government will patronise and assist and guarantee, and yet Indian firms will not go in and undertake the work, is that not discouraging?—A. I think if they get Government guarantees Indians may venture.

Q. But in the case of railways, we have very good examples of Government assistance, patronage and guarantee. You want the same system extended to ordinary industries. If people will not go into indigenous enterprises, where there is 6 per cent. return, is there any hope of their going into other industries, even if the Government should guarantee. Does this not produce a feeling of discouragement in your mind?—A. I cannot tell you exactly, because the capital is wanted everywhere, and in the railway line we have to spend more money, and so at the beginning they find the difficulty of capital, so I don't think that an Indian company will venture to undertake railway lines.

Q. Why not? If it is worth an European firm going into it, it ought to be worth an Indian firm going into it also?—A. On account of want of experience.

Q. I would like to get this point down; if want of experience is the real cause, won't the same lack of experience discourage Indians from going into industries, even if Government gave the same guarantee as that given to the railways?—A. Yes, that is so.

Q. Is it because they are afraid of failure, or because they don't get such a heavy return? Railways are very good illustrations. European firms go into railways and are willing to undertake railway projects with Government guarantee?—A. I think it is for want of capital and want of experience. These are the two things as far as I know.

Hon'ble Pandit M. M. Malaviya.—Q. You mean want of banking facilities and want of expert knowledge; these are the two causes?—A. Yes.

President.—Q. I should like to know whether this is not a fair question to be considered. We have railway projects that are available. They are under certain terms of Government guarantee. There is a case in which the investment is as safe as anything that could be made by Government, we are being asked by several witnesses to propose to Government that a similar system should be adopted for ordinary industries. If Indian firms will not go into railways when guaranteed, will they go into industries when guaranteed? Is that a fair way of putting the question?—A. *Hon'ble Sir R. N. Mookerjee.*—I should like to discuss it among our own members.

Sir F. H. Stewart.—Q. You give us instances of half a dozen industries, such as glass, porcelain, tanning, celluloid, etc., which you think Government might pioneer profitably in this province. Supposing that Government were to decide that they would do something in the way of pioneering these industries, which of them would you recommend; which would give the most promise?—A. Fruit-preserving, mangoes, especially in Bengal.

President.—Q. Is a similar factory necessary if one is already in existence in Mazaffarpur?—*Sir F. H. Stewart.*—A. He says in this province.

Sir F. H. Stewart.—Q. You have not collected any information about the glass industry?—A. No.

Q. Tanning?—A. I know that. I was connected with a tanning concern.

Q. Is that a recently established concern, or has it been going for some time?—A. No, recently.

Q. Is there any particular assistance you require there from Government?—A. Not from Government.

Q. You speak of a Board of Industries in Bengal, and you told Mr. Low that you think the Board should consist of business men and experts. What do you mean by "experts"?—A. Experts who know business scientifically.

Q. Business experts or scientific experts?—A. I mean scientific experts.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. You say, "thanks to the permanent settlement, even the people of the middle classes in Bengal are tempted to invest their savings and income

in land rather than in joint-stock or industrial enterprises." Do you think if Government guarantees interest or anything that zamindars will invest their money? *A.* Yes, no doubt.

Q. Have they invested their money in the enterprises that failed; did they put their money in largely?—*A.* Not largely.

Q. Excepting you, did anybody put their money?—*A.* Yes, one or two zamindars. They have failed and do not want to put any more money.

Q. If there was a Government guarantee or help; do you think the money will come in?—*A.* Yes, but at the same time we want experts.

Q. Do you think that if an industrial bank is started, zamindars will subscribe capital for a big industrial bank?—*A.* Yes.

Q. At what rate?—*A.* 4 or 5 per cent.

Q. About this expert advice, you say "free of all charge." Supposing you want an expert for a factory for two or three years, do you think Government should give you the loan of this man without salary for two or three years; or do you refer to advice only?—*A.* Advice.

Q. If you are going to have the man for two or three years, what then?—*A.* Not for two or three years.

Q. But supposing you wanted him?—*A.* At that time we must pay him; at the beginning we must have the help without remuneration or salary.

Sir D. J. Tata.—*Q.* You state here that "it is unfortunately true that the zamindars of Bengal do not at present give much attention and thought to industrial questions." You also say that due to the permanent settlement, even the middle class people don't invest in industries. Do you urge this simply as a sort of excuse why people in Bengal do not invest money in industries, or do you urge it as a grievance?—*A.* That is a grievance.

Q. Then how would you remove this grievance; by doing away with the permanent settlement?—*A.* No, I do not mean that. I meant that if the zamindars who have permanent interests in land, find that they can earn or get money in any other way, they will come forward to invest their money.

Q. It is true, but nearly every witness who has spoken to us about want of capital coming forward urges this as a reason; the permanent settlement makes everybody too contented. Which do you think is better, investment in land or the development of industries?—*A.* The development of industries, because there are very few zamindars in Bengal. The inhabitants of Bengal consist of about 10 per cent. of zamindars and 90 per cent. of the middle and lower classes, so we ought to consider that industry and commerce are the two main things.

Q. Then the remedy is to do away with the permanent settlement so that the people may then invest in industries?—*A.* I don't think so. There is no necessity for doing away with the permanent settlement.

Q. But you cannot eat your cake and have it at the same time; then you must be contented with things as they are?—*A.* The zamindars are contented but not other people, the middle and poorer classes. The inhabitants of Bengal constitute about 90 per cent. of the poor and middle classes whereas only 10 per cent. are zamindars, and they may be contented with their permanent settlement, but the remaining 90 per cent. are not contented.

Q. But you say that even the middle classes invest in land?—*A.* They wish to have land. If they save any money they don't like to invest their money in industries or anything, but they think that if they invest their money by purchasing land they are contented.

Q. The point is this. From time immemorial, the land-owner, the professional man, or the Government servant, was considered a higher individual than either the mere industrialist or worker, and here on this side everybody wants to be a land-owner or a Government servant or a lawyer or doctor, or something of that sort, because in Bengal you generally despise industries as being degrading; is that not the point?—*A.* That is not the point. We do not despise industries, but we do not know the ways of industries, so we are rather diffident and do not like to go into industries. That is the reason. We are not contented. Of course the zamindars are contented with their landed property and permanent settlement, but the people at large are not contented; they are suffering everywhere.

Mr. A. Chatterton.—*Q.* You say that you have been connected with various industrial concerns in Bengal for nearly 20 years; would you mind telling us what these concerns were?—*A.* The Bengal Luxmi Cotton Mills, Tannery and Pottery Works, Stone-ballast works, Ice Factory, and several other things.

Q. Taking the tannery which has been recently started as an example of these enterprises, is it a limited liability company?—*A.* Lately; at first I started it and then made it a limited company.

Q. How about the expert assistance that you wanted?—*A.* The Mysore Tannery has been appointed as managing agents, and they have their own experts.

Q. You mean the manager of the Mysore Tannery is the manager of your tannery at Berhampore?—*A.* Yes.

Q. Has that tannery commenced work yet?—*A.* Yes, it began about 1½ years ago.

Q. What sort of leather are [you manufacturing there?—A. They manufacture only chrome leather.

Q. What do they do with them?—A. They sell them here and also at home.

Q. They are exporting these hides?—A. Yes.

Q. Is this business developing?—A. At present we daily turn out 100 hides, but hope within two or three months that 400 hides can be turned out in a day.

Q. What are you going to do with these hides; export them?—A. Yes. Of course we must have the market here if it can be sold at any time, but it is generally sold by contract.

Q. In the management of this tannery business, besides the manager from Mysore have you any Bengalis assisting in the management?—A. Yes, I have got one expert whom I sent to America and England and he has learned the business there, and he is now employed in our tannery.

President.—Q. Which does he neglect, if he is the manager of the Mysore as well as the Berhampore Tannery?—A. They heard about the tannery here and enquired about many things. We heard the name of the Mysore Tannery and thought if we could put our business in their hands, it would be a prosperous thing.

Q. I don't see how one man can manage the two of them without making both suffer badly. It is encouraging two failures instead of one success?—A. (No reply from witness).

Mr. A. Chatterton.—Q. You say that you would "like the establishment of some central State banks where joint-stock companies may find easy loans on reasonable terms." What do you mean by that? Do you mean that they should get a loan without adequate security?—A. I mean that if a central industrial bank is established, and a joint-stock company, or any private gentleman wishes to establish any industry, they can get a loan from that bank and they will meet their urgent necessities and everything.

Q. Do you expect to get the loan without security?—A. Without security; when the joint-stock company was well started with some capital of their own, and when they have established their business at that time if they are in need of any money they can give the security of their own property and take an advance from the bank to meet their necessities.

Q. Did the Bank of Bengal refuse to finance this tannery which you are running?—A. As far as my information goes, the bank is doing nothing here. They practically decline to advance money to any of the native firms.

Q. How are you financing this tannery at Berhampore?—A. Most of the capital belongs to me and I have secured two gentlemen.

Q. Are you getting advances from the bank?—A. No.

Q. Where do you get your advances from?—A. At present from our own capital and if necessary we advance the tannery.

Q. You said just now that you were going to expand your business; turning out 400 hides a day will require a very large amount to finance?—A. At that time I shall be in a position to advance them money. It is very difficult to get any help from any bank there, so when business is increasing it will be better for me to advance the money.

Q. Have you applied in the case of this tannery for help from the banks?—A. No.

WITNESS No. 129.

Mr. P. L. Roy, Additional Legal Remembrancer, High Court, Calcutta.

Mr. P. L. Roy.

WRITTEN EVIDENCE.

I think, generally speaking, that the failure of joint-stock enterprises in Bengal is due to the following causes:—

- (1) The facilities that exist for lending out money at high rates of interest on tolerably good securities;
- (2) The want of proper training and commercial education; and
- (3) The distrust caused by the failure and non-success of several enterprises which have been started on joint-stock basis.

In my judgment, there is little chance of any purely Indian joint-stock concern succeeding without Government aid and a certain measure of Government control. I think money will be forthcoming if a big industrial bank were to be started by Government for the purpose of assisting local enterprises in which Indians of known ability and experience should be associated.

I think the Government should start model dairies in all the towns of Bengal where there is a municipality, and these might in time be leased out to Indians under proper safeguards.

In regard to cottage industries, the Government should establish central depôts, where such articles may be collected for the purpose of sale, and the cottagers should be financed by means of co-operative banks under Government control.

Note.—Witness gave confidential oral evidence.

WITNESS No. 130.

Mr. T. W. TUTWILER, *General Manager, The Tata Iron and Steel Company, Limited, Sakchi.*

WRITTEN EVIDENCE.

Training of labour
and supervision.

I have been in India for the past 5 years in the employ of the Tata Iron and Steel Company, and the greater portion of this time has been taken up in supervising the training and teaching of Indian workmen. My opinion is that the main things to be done to improve the Indian workmen's efficiency and skill can be summed up in a few words :—

- (1) Pay them sufficient wages to enable them to provide nourishing food.
- (2) See that they are well housed and that their living quarters are sanitary.
- (3) See that the men who are brought out from foreign countries to train the unskilled workmen are thoroughly competent to guide the unskilled men.
- (4) Provide sufficient innocent amusements for the workmen.
- (5) When any workman shows an aptitude for any special subject, give him every facility for developing it.

Most of the work for which we have had to train the Indians was entirely new to them, as this was the first industry of this kind of any magnitude in India.

I enclose a statement* showing, year by year, since the beginning of this plant, the number of covenanted and local men employed in each of our operating departments together with the total yearly wages paid and the tonnage produced. From this statement you can see to what extent we have been able to substitute Indians for Europeans and at the same time increase our production.

One of the effects of the Tata Iron and Steel Works has been to afford a source of continuous employment all the year round to a great many people, our total number of employes, including our mining camps, being fifteen to sixteen thousand, the majority of whom before our works started mainly followed agricultural pursuits which entailed intermittent and uncertain occupation the reward of which depended very much on the vagaries of the monsoon.

Efforts are being made at Sakchi to educate the workmen, and in this the Steel Company has been helped a great deal by the Local Government. We are about to start a technical school of a very elementary nature the purpose of which will be to teach our mechanical, electrical and other employes to read blue-prints, to draw, and so forth, so that they may become more proficient in their work. We also have a free night school where our boys and others employed in our works during the day are taught to speak, read, and write English, to count, and so forth, as we consider that one of the greatest handicaps an Indian workman has is that the majority of European foremen brought out do not speak Hindustani, and it is very difficult for either foremen or workmen to make themselves understood.

Our employes come from all parts of India, and I do not think it could be said that any particular race in India is superior to another. The experience here has been the same as everywhere else. When starting up a new plant, you get lots of good men and lots of bad men; the good men stay with you and become efficient, the bad ones find the work too hard and leave. My opinion of the Indian workmen taken as a whole is that they are very intelligent and quick to learn, and they generally shape well when they are trained properly. As an illustration, we will take the bar mill department. Originally, 9 Europeans were employed, and at this particular time the output of the mills was about 400 tons per month. Originally this department had one 16" and one 10" mill. Since that time we have extended this department by the addition of another 10" mill and worked double shifts, that is, 18 hours instead of 9 as was done when the mill was producing 400 tons monthly. Our average production at present in this department is 2,200 tons monthly, and we employ only 2 Europeans. So you will see from this that Indians, given every facility and encouragement, just as industriously apply themselves to this particular kind of work as Europeans, possibly more so during the hot weather, as the tropical conditions are less irksome to them. And this applies to all departments. In the electrical department, 2 Europeans were formerly employed as you will notice from the enclosed statement, and their positions are now being filled by Indians. In the laboratory we originally had 5 Europeans; these have been reduced to 2, Indians having been put in their places. I would like to add that in both these departments Indians engaged in the place of Europeans have had experience and training in foreign countries. I doubt very much if without their having had this experience they would have been able to hold their present positions.

In my opinion, in the iron and steel industry, Indians will be able to replace Europeans up to a certain point, and I will try to make my meaning clear to you by taking each department separately.

Our coke oven plant consists of 180 Coppee non-recovery ovens and 50 Koppers bye-product ovens. I consider that a European Superintendent and one Assistant are all that is necessary to operate this department.

We have two blast furnaces producing at present between 575 and 600 tons daily. 9 Europeans are employed in this department, which I do not think can be reduced until Indians are sent abroad and trained from the bottom up.

*Not printed.

Steel works.—In this department, I should say within the next two years for the same number of furnaces that we are now operating, European labour can be reduced very considerably.

Rolling mills.—In this Department, we are reducing the European element considerably, but until the War broke out we bought our rolls from abroad; after the War was declared we were unable to get them from abroad, so had to make them ourselves and consequently had to bring out European roll turners, as this is special work and it will take several years more before Indians can be trained to replace this class of workmen.

I do not think we can get Indians to replace foreigners in the higher positions in the industry with which I am connected until Indians are sent abroad and trained. It seems to me that too much value is attached to the importance of receiving a university education in this country. A good education, I firmly believe, is necessary, but it is not an essential thing that a man has to go to a university to make a good and efficient workman. If an Indian desires to take up an industrial career, instead of continuing his education until he is 22 or 23 years of age and then expecting because he has received that education to commence his industrial career at the top of the tree, he should make up his mind what particular kind of industry he desires to go in for, leave school at about 15 or 16 years of age, and become attached either as an apprentice or workman for a period of years; this period would be invaluable to him for more reasons than one. The period would be invaluable to him for he would get the opportunity of making a skilled and efficient workman equipped with a knowledge of that particular trade or industry which has to furnish him a livelihood, while on the other hand, it gives him an opportunity of discovering whether his selection of an occupation has been wisely or unwisely made. During this time he could with great advantage continue his studies in his leisure time on the theoretical side of the industry, and at the expiration of his apprenticeship (if circumstances permitted) two or three years in a European country would enable him by association with modern and up-to-date practice to attain the same degree of efficiency as the European.

Under the present conditions of Indian labour, although the European element has in our works been greatly reduced, I feel that it will be necessary to have European supervision and direction until such a time as the company picks out youngsters and sends them abroad, making arrangements with some of the foreign firms to take them into their works and make them start at the bottom and go through the school of hard knocks. I suppose you will ask the question why we cannot train Indians here for the higher positions instead of sending them abroad, and my answer to that is this. I will not say Indians cannot be trained here for the higher positions, but in my opinion, if Indians are sent to foreign countries before their habits in life are formed and before they are too old to be influenced by home ties and religious scruples, they will enter upon their work in a freer atmosphere and will see other young men, their equals in social status, beginning at the bottom and working up; and it is my opinion that to become efficient in any department of the iron and steel industry and to be able to teach others it is absolutely necessary that they should go through every stage of the process. I do not think that Indians of the type who would make superintendents or heads of departments would be willing to go through this course of training in this country as they would feel that their social status would be lowered by doing the work of menials which they would have to do if they began at the bottom. When this is done, the iron and steel industry will be more firmly established in this country.

Not only is the question of substitution of Indians in the place of covenanted hands important from the point of view of the stability of this industry, but there are other aspects of this question of the replacement of foreigners by Indians which should not be lost sight of.

First of all is the question of language, which is such a great bar to the foreigner in imparting instructions to his workmen. An Indian in the place of a covenanted hand, knowing their language and the ways of his workmen, should be able to guide and instruct his workmen better than a foreigner who generally does not know and does not care sufficiently to take time to learn the language.

Secondly, an Indian should take more interest in his work, as he should consider that his reputation and livelihood depended upon the results of his work, which is not the case in the majority of covenanted hands brought from European countries. The covenanted European can always obtain employment in his own country, and he also receives certain benefits from his contract: this, I think, has a tendency to make the European more independent, and consequently he is likely to slack.

If an Indian has proper food and nourishment, he should be a steady worker and better able to stand the climate of the country than a foreigner, who usually comes out without his family and misses the wholesome influence of public opinion such as exists in his own country, and is therefore apt to dissipate, which is hardly conducive to his regular attendance.

As a rule, the Indian is more amenable to discipline than the foreigner, who on the strength of his contract or under the impression that he is indispensable to his employers is apt to get a swelled head and to disregard discipline.

Again, the Indian has a permanent interest in the place and the country, and naturally takes more interest in his surroundings and helps to develop the social and intellectual side of his community.

When an Indian is substituted for a foreigner, there is a great saving in salary, as the covenanted hands have to be paid much more than the Indians. Over and above salaries, covenanted men are given free passages to and from their homes, and salaries while travelling; they are also paid very handsome bonuses when they exceed certain tonnages.

I am sure that where Indians have been substituted for Europeans in these works, the quality of our products has not suffered, and you will see from the attached statement that the tonnages have greatly increased. In other words, I consider that our sections have improved, and I make this statement on the strength of what has been told me by prominent members of the Calcutta engineering trade.

Again, it should not be forgotten that the successful demonstration given by this company in the gradual substitution of foreign labour by Indian labour would encourage capitalists to venture into new enterprises from which they are at present held back by the prospect of having to employ costly foreign labour.

As I said before, some of the Indians have obtained very high and very responsible positions in our works that were formerly held by covenanted hands. This should prove an inspiration to young Indians who are looking out for careers to divert their energies along technical lines instead of going in for the overcrowded professions of medicine and law; but I think these young men should be advised to moderate their ambitions and not aspire to become general managers in a couple of months.

You will please understand that the above remarks are made only in regard to the iron and steel industry, as I have had no experience in other industries in this country.

ORAL EVIDENCE, 11TH DECEMBER 1916.

President.—Q. I should like to know if at Sakchi there are any uneducated Indians who are now replacing European artisans? You have mentioned cases of a certain number of educated Indians who have been taken into the works and have successfully replaced Europeans who were previously employed?—A. Many more European and American artisans have been replaced by uneducated Indians than by educated Indians.

Q. And have they replaced any of the European artisans?—A. Yes.

Q. Could you give some idea of the kind of work that they are doing that was formerly done by Europeans?—A. Heaters in the mills, keepers, cinder-snappers, moulders and helpers in the blast furnaces, foremen on the coke ovens, foremen on gas producers, crane drivers, rollers at the blooming and bar mills.

Q. These are uneducated? Yes.—A. I mean by that they may be able to read and write but they had no theoretical knowledge.

Q. No university training and no technological knowledge?—A. No. Except what they have picked up at the works.

Q. What is the highest pay that any of them is getting?—A. Rs. 250.

Q. Take a man of that type.—A. What was he before he came to the works? He was a mechanic.

Q. What was he getting?—A. I think Rs. 1-8-0 or Rs. 2 a day.

Q. That is Rs. 45 to Rs. 60 a month and now he is getting Rs. 250?—A. Yes, *plus* overtime allowances.

Q. You have one particular man in view. Do you know anything of what he is doing with his money and what sort of effect it has had on his home life?—A. I have seen him with his wife well dressed up. I have seen him at the picture shows. Beyond that I do not know very much.

Q. You say that the men should be paid sufficient wages to enable them to provide nourishing food. We have heard from several witnesses that additional wages are of no value unless the man has some healthy way of spending it. With an increase of wages the man indulges in a little more drink accompanied by staying away from work for one or two days in the week. Do you find that to be the case?—A. I do not.

Q. To what do you attribute the better result at Sakchi?—A. To sanitation, to providing better classes of houses than they have been used to, to providing amusements, such as games, picture shows and so forth with the idea of raising their social status.

Q. Generally you mean that when they get a higher wage they will be tempted to enjoy their wages in a healthy way and that you are getting satisfactory results?—A. I think so.

Mr. C. E. Low.—Q. There has been a good deal heard of a letter published in the *Bombay Chronicle* by an *ex-employé* of Messrs. Tata. I think his name is Mr. Antia. The general purport of it was that while Messrs. Tata were making professions of giving greater employment to Indians they had no intention of doing so?—A. My written evidence deals with the point. I know Mr. Antia is only a lawyer with two months' experience in the steel business.

Q. Probably he was not a competent person?—A. I do not think the man to my knowledge has ever been round the works at all. How could he judge without seeing the thing fully.

Q. You speak of covenanted men. What do you mean?—A. I mean men imported into India under an agreement.

Q. What is the attendance at your night schools roughly speaking?—A. The average number attending the night school at present is about 70. We have not enough room and teachers for a larger number of boys.

Q. It has often been said that in the case of industries which involve long and hard hours of work like engineering, people are too tired to attend and profit by night schools. Do you find that is the case?—A. I think that would be the case if men were required to work twelve hours. But our men work only eight hours and the majority of the younger boys do not hold responsible positions and do not do much hard work.

Q. If you select a certain number of the more promising boys and train them do you think you will find that it pays you in the end?—A. I think a certain number of the selected boys should be given shorter hours of work and be specially trained.

Q. How long have you had this night school going?—A. About two years and six months.

Q. It is yet too early to judge of the results?—A. Yes.

Q. There is only one steel business in India and unless the man gets the experience in your works he cannot get it outside?—A. The experience a man gets at our plant would not be of much benefit to him in any other kind of work as the machinery and so forth required for the operation of our steel works is very different from that required for any other industry.

Q. That sort of thing cannot go on indefinitely, if you get a suitable technological institute in Calcutta and if you go on training your men higher and higher?—A. Yes.

Q. You say "I will not say that Indians cannot be trained here for the higher positions, but in my opinion if Indians are sent to foreign countries before their habits in life are formed and before they are too old to be influenced by home ties and religious scruples they will enter upon their work in a freer atmosphere and will see other young men, their equals in social status beginning at the bottom and working up." I gather that when your steel works are placed on a somewhat wider basis, as at no distant date it will be, you will be able to give them the atmosphere you speak of?—A. I think so. If we get a dozen men trained in the way I suggest they would come back and be able to train others.

Q. You want men to create an atmosphere in which you could not only run your works but train other people?—A. Yes.

President.—Q. Have you any experience of the men who have been trained in Europe?—A. Yes. With electricians, chemists and in the commercial department.

Q. What salary?—A. Rs. 200 to 300.

Q. Was Mr. Antia a man who had been to Europe?—A. For law.

Hon'ble Pandit M. M. Malaviya.—Q. Don't you think the lack of elementary education is an impediment to industrial efficiency?—A. I think everybody should be able to read and write as a general principle. But to screw a nut or a bolt it does not make much difference.

Q. If in addition to that general education the boys received a little elementary education in science, in physics and chemistry, and in drawing and manual work, do you think they will make better workmen?—A. Yes. That is what we are trying to do. We are starting a little drawing school.

Q. Do you contemplate having a school for the children of workmen for giving them instruction in the three R's?—A. We have a school which we intend to enlarge so as to give elementary education to all boys and girls of a school-going age.

Q. Do the workmen show a desire to avail themselves of the teaching?—A. I am not in a position to say until we get the necessary equipment for our drawing class.

Q. You have stated to what extent Indians have replaced Europeans does that apply not only to the lower grade of men but also to the higher grade men?—A. It applies more to what we call the skilled workman.

Q. And does it apply above that to the foreman class?—A. In some departments, not all.

Q. You are getting Indians to act as foreman in some departments?—A. Yes. But not in the entire charge of a department.

Q. Have you a system of apprenticeship to train some of the workmen to become qualified in course of time to take charge as superintendents. Do you contemplate introducing any such system?—A. No. That is why I suggested sending these men abroad.

Q. Would you select some of the promising men and send them out?—A. That is my idea.

Q. Apart from this idea of sending men to foreign countries, have you in contemplation a system of apprenticeships for training promising workmen to hold higher positions?—A. Yes. Such as foremen and so forth. We are doing that now. But there is no regular system of apprenticeships such as the railways have.

Q. Do you think you can introduce such a system?—A. That is being talked of by the company.

Q. You say that in the steel industry Indians can replace Europeans up to a certain point. Do you mean to say that beyond a certain stage you would not be able to train them in this country?—A. Just at present. We are only in the beginning now.

Q. In the beginning you must get competent men from outside. Even in America you imported several hundred English workmen to insure the success of your first efforts to produce steel of the best quality?—A. That will have to be done in India. In America we also send our men to England and other foreign countries.

Q. You say 'I don't think that Indians of the type who would make superintendents or heads of departments would be willing to go through this course of training in this country as they would feel that their social status would be lowered by doing the work of menials which they would have to do if they began at the bottom.' If you find Indians who get rid of that feeling and who are willing to start at the bottom, do you think that in course of time you can train them in this country for the kind of work you refer to?—A. It is possible but in my opinion they could be trained much more rapidly in foreign countries than here.

Q. Do you know that Japan has been training its own young men?—A. I do not know whether this is the case, but I do know that a great number of Japanese are in America studying methods of our manufacture.

Q. Nobody would say that you must take Indians simply because they are Indians irrespective of their efficiency. From your own experience, you find that where Indians have been substituted for Europeans the quality and the quantity of the work have not suffered?—A. Yes.

Q. Do you think that if you carry the principle further and appoint more Indians in the higher posts, the results will be equally satisfactory?—A. I think it would not make any difference whether he was a European or a Indian provided he had the same training as a European.

Q. Except in the matter of costs?—A. It costs much more to import people.

Q. You say that if an Indian desires to take up an industrial career instead of continuing his education until he is 22 or 23 years of age he should leave school at 15 or 16 and become an apprentice. Is that the system that prevails in America? Have you not got higher technical schools and universities for training young men for practical work?—A. We have practical demonstration in those colleges. They have their own furnaces or access to manufacturing plants.

Q. If you have similar institutions here which have workshops attached to them where practical demonstration could be given, with the right kind of instructors, then do you think it would be an advantage to Indian youths who wish to take up an industrial career to receive their training at these colleges?—A. Yes.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. I find from the table given in your note that formerly you had in your steel works 55 covenanted hands whereas you now have 36. Have the rest been replaced by Indians?—A. Yes and we have since been producing more steel.

Q. In the Tata Steel Works are the consulting engineer, the construction engineer and the manager all Americans?—A. Yes.

Q. You say that the number of Europeans has been reduced from 55 to 36 and the table shows that the amount paid to local hands was also less with an increase in output. In fact there has been a general improvement?—A. Yes. There has been an increase not only in tonnage but also in efficiency.

Q. That means to say that you have increased your output with a reduction in the cost and there is a real improvement all round?—A. Yes.

Q. The salaries of the covenanted men are just the same?—A. No. Salaries of covenanted men are higher, for when we replaced the Germans by Englishmen and Americans we had to pay higher salaries to these English and American employés.

Q. You said that the three people are Americans?—A. Yes, they are Americans but at present the consulting engineer and the construction engineer are one and the same.

Q. Is it true that you have got only American locomotives?—A. Originally we had only four American locomotives and two blast furnace hoist engines which is a very small proportion of the total machinery.

Q. You generally depend for advice on the consulting engineer?—A. Yes.

Q. And still you have got so much less of American machinery?—A. The four locomotives cost us Rs. 32,000 each and the hoist engines cost us Rs. 16,000 each.

Sir D. J. Tata.—Q. I have heard it said that it takes a generation to make a steel worker. How far is that true, that you cannot be a steel worker under one generation? Would you endorse that statement?—A. That is a pretty big question. It depends a great deal on the men and their training.

Q. I understand that to introduce the steel industry into a new country you would require a generation before the people in the country are sufficiently trained to take up the industry themselves. I want to know what exactly it means? President.—A. It does not mean anything.

Q. My point is that there is a feeling that Indians are not employed in sufficient numbers in these works. These have been going on only for 5 or 6 years. I want to know if any special training is necessary before they could be fit for such employment?—A. That is quite obvious.

Q. You say that Indians should be sent abroad so that they could be made to feel that it is not degrading for men of superior education to begin from the bottom. Can you give us some idea of the nature of work that one has to undergo before he can be trusted to take up responsible positions? How did you yourself commence?—A. My very first experience was that of shovelling coal, firing boilers in a blast furnace plant.

Q. How long were you at that?—A. Four or five months.

Q. How many hours had you to work?—A. 12 hours every night.

Q. How many days a year?—A. 365 days.

Q. You worked every day in the year?—A. Yes.

Q. There is no such thing as half holidays or Sundays?—A. No, not on blast furnace work.

Q. Before anybody is fit to take charge you think he must go through all these stages?—A. I think he must go through every process to be a really efficient man.

Q. So you say that to take up any important position the man must go through all this hard work?—A. Yes. And especially in a new country like India.

Q. Not in an old country?—A. In an old country where the industry has been in existence for sometime and where the organization is complete, there is a sort of steel atmosphere created and the boys go into the mills very young with their parents so that by the time the parent retires the son is ready to replace him.

Q. It would therefore actually be many years before any one could fill the more important positions?—A. Yes. I do not think I would trust anyone who had not a thorough knowledge of the subject to handle a plant of any magnitude.

Dr. E. Hopkinson.—Q. Have you tried the provision of meals inside the works?—A. No not as yet, but I think it would be a very good idea if for no other purpose than to show the employes how to cook food in a sanitary way.

Q. Some of the operations must involve great physical strain on the workmen. Do you find that Indians stand such strains as well as Americans and have equal physical endurance?—A. Taking every department I do not think so. But they are getting better and better. They are improving physically. They will improve further in course of time.

Q. You suggest that when the workman shows an aptitude for anything he should be given facilities. Will you illustrate that?—A. For example, in the bar mills department we start a man with the tongs and if we find he cannot handle them, we put him on reheating furnaces or the producers. And if after two or three trials we find him unsatisfactory we dispense with his services.

Q. It is selection?—A. We try him on one thing and if he is not successful in the first we put him on to another.

Q. At the present time you select the boys and men who go to the night schools and technical classes?—A. If the department head thinks that a boy is clever and that he wants to get along he will tell the secretary of the school and he will select the boy.

Q. Do you think the time will come when you will make it a condition of employment that boys shall attend a night school?—A. Speaking for myself I would not think so.

Hon'ble Pandit M. M. Malaviya.—Q. What was the college training that you received?—A. I went through the University of Alabama.

Q. You had special courses in technology?—A. Yes.

Q. In the smelting of iron?—A. That was in the districts. It was about 30 miles from the college.

Q. Did the college course include the theoretical portion of the education?—A. Yes.

Q. And the practical portion you learnt in the workshops?—A. Yes.

Q. After completing your education at the college you went to the place that you mentioned that was 30 miles away?—A. I went and worked in Birmingham in Alabama.

Q. Was it part of the college course that you should attend some workshop?—A. No.

President.—Q. About these men whom you propose to send to England; when will you send them, before they go to school?—A. I would not send them to England before they get a common school education.

Q. At what age?—A. About 16.

Q. That is cutting right into the fundamental life of the Indian. Are you likely to get any boy of this kind except where his father has been brought up in the works? Do you think that anybody else would send his son to Europe to learn the iron and steel manufacture?—A. That I cannot say.

Q. If he were brought up in the works and actually living in the atmosphere that would be a different thing?—A. Yes.

Q. We have had a number of proposals put forward for the artificial development of industrialism. You say that they should go through the school of hard knocks, but in Europe it has been a matter of hard striving. A man is born in industrial conditions and strives to be the best of his caste. How is that spirit going to be planted in this country?—

A. That is why I said that they should be sent abroad in order that they might imbibe that spirit.

Q. If you had the industries and thereby created the atmosphere you would get a certain number of men who would be able to get a higher form of training either here or abroad than you are likely to be picking the men artificially?—A. That was also my own idea. If a boy were to be in the works and round the works whether he may be still at school or working in some minor position if he showed the aptitude, then that aptitude could be fostered.

Q. The industry then must precede the suitable education. Unless you have the industry you are not going to get the industrialists?—A. All that I mean is to take the boy who shows this aptitude, send him abroad and give him practical and scientific training and then bring him back.

Q. He is not going to show the aptitude unless there is the industry?—A. That is my opinion.

Q. If we start the industry and develop this atmosphere you could pick out suitable boys to send home for training. How are you going to do this in the case of the other industries that are not existing at present?—A. I do not know how that can be done. I am speaking of only the steel industry at Sakchi.

Q. Then in your opinion this is never going to be done unless there are industries in the country. The industries must be started first before the right kind of man can be picked up. There is at present a system which has been experimented upon since 1904 of taking young men from schools and colleges and sending them to Europe with scholarships in order that they might start new industries in the country when they return. What is your opinion on a proposal of that kind where the industries do not exist? Do you think it is possible?—A. It may be possible. But my opinion is that young men should be specially selected and sent to England and placed at the bottom of industries for which it is intended to train them; then after completing their apprenticeship, if the authorities decide that the young men are promising, they should be allowed scholarships so that they can equip themselves with the necessary theoretical knowledge. By this method in my opinion not only will the country be benefited by having industries started on proper lines, but young men would be saved from the disappointment of blasted hopes.

Hon'ble Pandit M. M. Malaviya.—Q. You have told us that in the colleges in your country the workshops now form an essential part of the institution?—A. I do not say in my country.

Q. I thought you said that in your days they were attached to the college?—A. In the Northern State they were. In Alabama they were not.

Q. So far as you are aware in colleges in America workshops are attached for giving practical instruction of a technological kind?—A. That is right in the case of the industrial colleges not only in America but also in England.

Q. What is your experience of the young men trained in these industrial colleges in America? Do you think they come out qualified to start industries or to work in those industries with a view to rise to responsible positions after a few years' experience?—A. They must start at the bottom when they start their college course as their workshop training and their theoretical training go side by side.

Q. Would they be better qualified than the young men whom you would select at the age of 16 and send to Europe or America for training?—A. Yes, for they have a foundation which would help them.

Q. Supposing we have an institution like what you mention at Sakchi where theoretical as well as practical training could be given, and where in addition the young men could be sent to your works for further practical training, do you not think that will give them as good a training for all practical purposes as may be necessary?—A. I think that will give the men a good chance.

Q. You do not think that it is feasible to send out a sufficiently large number of students to England and America at the age of 15 and 16 in order to get a sufficient supply?—A. I do not think it is advisable to send them to America.

Q. The only chance therefore for developing the capacity of Indians is to establish a technological institute at Sakchi?—A. That has been talked of.

Sir D. J. Tata.—Q. With reference to those hard knocks that you refer to, without them you would not have got licked into shape? Were not those knocks rather literal sometimes?—A. Yes. I think every successful man has to go through those hard knocks.

Q. With regard to yourself you were brought up in an atmosphere of steel. You belong to a family that was accustomed to the surroundings and though you were the son of an employer of labour you did not mind working with your hands and working up your way. Do you think that this is the real road to success, to begin at the bottom and work your way up?—A. I think you should begin at the bottom if you want to succeed, for to specialise in any subject a man should have a thorough knowledge of that subject.

Q. Because you were the son of an employer of labour you did not want to go straight off to a comfortable appointment?—A. If I had that idea, it only took two days to knock it out of my head.

WITNESS No. 131.

DR. A. MCWILLIAM, *Government Metallurgical Inspector, Railway Department, Railway Board.*

WRITTEN EVIDENCE.

Q. 5 (7).—The guaranteed purchase of their products by Government has been as the Government assist-
breath of life to Tatas. The Government guaranteed to take 20,000 tons of rails every year^{ance.} for 10 years if the rails passed the Railway Board's specification. The order amounted in normal times to some £160,000 or about 24 lakhs of rupees every year or a total of over one and a half millions sterling. The prestige of having fulfilled contracts for rails for Indian State Railways, which has been, for so long as I can remember, one of the standards of quality for common steels together with the most extraordinary series of runs of good luck, have established them in a firm position when without these they might not have succeeded with the men they chose. The rebellion in China gave Tatas a market for some 10 lakhs of tons of pig iron; the fight between the British Indian Steam Navigation Company and the Japanese firm meant that the pig iron was carried at little more than half the usual freight; a strike at home then compelled people to use their structural steel at a time when it was viewed with suspicion and lastly the war came and poured money into their coffers. There is no doubt room for other steel works but the promoters must depend more for success on getting the right men and carrying out the operations economically, for no second firm can hope for such good luck.

Q. 6.—If Government gives some very substantial help they should stipulate that if possible the general manager of the works or head of the community should be a subject of the British Empire and there ought to be an understanding that unless good cause could be shown purchases of plant should be made within the Empire. It is, rightly, I think, one of the tenets of these firms that the purchase of Indian goods should be encouraged. It is an obvious extension of the same principle to buy British Empire goods when reasonable.

Q. 14.—There should be no limitation of Government aid from this point of view so long^{Limits of Govern-}
as it is clear that the new enterprise when properly started can stand by itself when the^{ment assistance.} preliminary aid is withdrawn.

Qs. 15 and 16.—I have had many years experience of technical and scientific aid^{Technical aid.} provided by the University of Sheffield. Our experience in Sheffield some 20 odd years ago was that we were being throttled by Government in return for a paltry grant-in-aid. We had to cut ourselves adrift and take our own way, in thoroughly scientific work but suited to the needs of the district, whereas before, we were compelled to work to an ancient standard pattern the same for the whole kingdom. If a man has an active brain and a soul to guide him in real work you cannot squeeze them into a universal paper form; without partially stultifying his work and wasting his energies. After the change our success in numbers was immediate and our ultimate great success in helping the industries of Sheffield and district is almost universally recognised. This is mentioned especially as a warning that the throttling tendency of Government interference with research must be considered so as to be avoided.

Q. 17.—Private firms or companies should pay for the services of the Government experts. I have done a great amount of consultation and advisory work free for firms that were considered not able to pay or under circumstances that were against charging a fee but the sum of my experience is that most firms wish to pay, that all firms ought to pay and that it is the way to make them begin to appreciate the value of the help.

Q. 18.—It should be understood from the beginning that Government would permit the publication of the results of researches made by a Government paid expert when attached to a private firm, unless they considered it unwise for military reasons, and that the firm should allow publication unless they could show that it would be detrimental to their business interests and then only to stay publication for a maximum of 3 years. I have found as a rule that when firms did not wish results to be published I had formed the opinion myself that it would not be fair to ask for it and on the other hand when I had decided that publication would not injure the firm they have agreed and given their consent, generally asking for the lapse of a year or so, some stipulating that no names should be mentioned whilst others were quite pleased to have their names associated with the encouragement of research and the use of its results. Recently it has become so fashionable that it is a form of advertisement for firms.

Q. 19.—The iron and steel industry here is so small that I do not think a demonstration^{Demonstration}
factory would be needed, but I have suggested that in the proposed new technological insti-^{factories.} tute at Sakchi or elsewhere a small electrical furnace preferably of the induction or Kjellin type—the arc type will be used in the works—should be provided as so many industrial steel processes can be imitated and reactions and results studied both by bad and by good methods. I have used one of these furnaces to imitate processes so divergent as crucible steel melting and the working of a basic furnace to make mild steel from an all-pig charge. The same furnace by an easily made change of the bed can be used for the manufacture of non-ferrous alloys.

One part of our laboratories in the University of Sheffield is practically a works in miniature making single heats up to 2½ tons, where correct methods can be studied, inferior methods done to show why they are inferior, and new ideas tried at a comparatively small cost. We were, I believe, the first to make a vanadium-chromium steel successfully in the open hearth when vanadium cost just a sovereign a pound and it was found highly profitable on a large scale.

Research abroad.

Q. 22.—A considerable amount of value and proving of ground could be obtained by using consulting and experimental experts at home. The expense should not be greater and might be less for certain work than doing it here and the responsibility incurred would be very much less because trial investigations could be made as a test of their value to the industries and of the demand for them, and after each investigation or set of investigations is finished no further liability is involved. This would be especially valuable until India had her own research department, if it was decided to have one, for the standard of man who could be used in this way would be very expensive to bring out or might not be procurable. I had some interest in a very good example of this at home. The large works find that it pays them now not only to have a good man for research but to have a department for research that has no routine manufacturing responsibility. When I was on leave I was offered the headship of one of these. To enable the commissioners to estimate what percentage to deduct from the value of the above suggestion I ought to mention that it is most likely that I shall soon be a consulting metallurgist at home.

Surveys for industrial purposes.

Qs. 25, 26 and 27.—Just as we are taught about military operations, so the roads to success are laid by sound reliable information as full and detailed as possible, that deposits which would be valuable may be very small parts of the crust. The Geological Survey would search for these and on discovery make them well known and the Government industrial experts if in existence or private enterprise would examine the deposits to judge of their industrial value as Tatas have done so successfully. There have been important discoveries of commercially valuable deposits other than coal even in England within the last ten years.

Government patronage.

Q. 37.—The articles of iron and steel are, I think, well known. The great products of Tatas for example are structural steels to British standard and one railway's specification, rails all but one to British standard section and to different specifications mainly the Railway Board's.

Training of labour.

Qs. 44 to 46.—Owing to the decay of the apprenticeship system and the increased specialisation of the worker in engineering, the provision of means of increasing his knowledge of machine tools and in engineering and metallurgy of his industry generally, have been much appreciated. A young man is working all day at one machine only and cannot get a job at anything else. He comes to the technical school or college in the evening and can become fairly proficient in the use of other tools, the lathe, the planing machine, the milling machine, and so on. He is thus also introduced into a home of learning and in many cases goes very much further than was his original intention, taking up drawing and studying the more theoretical subjects connected with his work. Managers of works have come for training that was not available in their youth, and I always had a profound respect for them as not only wise but very brave men. We had one well known proprietor and public worker who took his place beside one of his own furnace labourers who had felt something better within him. In metallurgy a young man may be doing analysis only. He learns furnace work at the college and in many cases thus gets his chance of going out into the works. When at home I found one such who had become works manager and director of an important firm, and there are many similar.

Q. 50.—Industrial schools should be under a Department of Industries.

Training of supervising and technical staff.

Q. 51.—If these men are to be trained instead of imported there should be technical colleges for this purpose. Of that I have had great experience which may be summed up in that they are not very difficult to design but that their success depends on the difficult task of getting the right man to carry out the ideas properly and of clinging to as much freedom of action as possible.

Q. 52.—No help should be given to supervisors, managers and technical experts of private firms to study conditions and methods in other countries. The firms should attend to it if they are fit to live.

Q. 53.—As Government should interfere with the firms assisted as little as possible after they can stand alone, firms should not be required to train experts, but might be asked to do so if it was desirable.

Organisation of technical and scientific departments.

Qs. 64 to 66, 68 and 70 to 74.—There might be sufficient demand for the services of a permanent metallurgical expert, and the difficulty would be to get the right man who ought to be selected with the greatest care for his practical knowledge and experience in research. The degree of the need could probably be tested first after the manner of my answer to 22, but, however any proposed research department may be constituted, the head should be responsible to some one as high up in Government as feasible and the head of the metallurgical or any other section should be as independent as it could be arranged, the relationships between him and the head of the whole being something like that of an English University professor to his Vice-Chancellor, his own freedom being of the same nature. He should be allowed to get into direct correspondence with firms as to supply of chemicals and apparatus and to the extent of his budget to order personally from them, any small disadvantage as to

freight being much more than counterbalanced by his living contact with sources of supply and his ability to meet his own requirements as they occur.

Local Governments should only engage their own experts when either they think that there is sufficient work for them in sight or they have practically the monopoly of an industry. It would be advisable to test the market and find how best these experts could be obtained and on what terms. Technological institutes founded should be developed as part of a large scheme but with a great degree of individual independence. There should be an understanding as to the subjects they would take up but no hard-and-fast rule. For instance we were supposed to concentrate on iron and steel but had we been debarred from undertaking research on gold and copper we would have missed some pieces of excellent work that were of value not only to the local gold and silver industries but for the important light they shed on iron and steel difficulties. The Government control should be as light as possible and Imperial unless in special circumstances where provincial seemed desirable after a full and fair consideration of the position. There should be elasticity in the arrangements made.

Q. 77.—It should be a settled principle that every reasonable facility should be given to Government technical and scientific experts to study conditions and methods in other countries. An iron and steel expert is isolated here. I was astonished when I went home to brush up after a little more than 3 years to find how much had been done. Study of foreign methods.

Q. 78.—I have not much difficulty as I have a good library of my own. A properly chosen library is a splendid investment and a central one for all industries should be formed. The volumes could be available on loan by post to persons interested on payment of the postage and a deposit of the value of the book. Books on industry are mostly written now-a-days not by purely literary men acting as compilers but by recognised experts and often in the works a man will make out of a good book in a month more than its total value. Reference libraries.

Q. 78.—I could give dozens of examples of advantages following the issue of special Government monographs. One will suffice. An old student who though the only son of the proprietor of a works had come to us from his own town and gone through our most thorough training in the early days of our work, became the unusual combination of a good scientist, a first class technologist and a most successful captain of industry. I saw his works soon after he returned to them. His father gave him his head and the last time I saw his place before the war he had had to make it from 3 to 4 times as large. Once many years ago I was feeling a bit depressed about manufacturers apparently not making as much use as they might of our published results. I mentioned the subject to him for when we met we went right down into the heart of whatever technical matters cropped up. "Name a subject" "Well that alloy of a couple of years ago," indicating it. "Hoot awa' man, I've hundreds of tons of it running about London alone already and I didn't do it for fun. You go on, we study every line you publish and use most of it". If I could tell you what I saw when last I went round those works it would make a dramatic sequel of success and emphasise the value of such work not only for industry but in providing apparatus of great protective value in the country's time of need to a degree of perfection that could not have been attained without the skill acquired by such fundamental training and long practice on sound lines. Government publications.

Q. 88.—Experts might be employed to condense the information published each year in technical papers and publish the result in pamphlet form, adding a list of references to researches and other matter not suitable for condensation not omitting such details as prices, names of publishers and a rough idea of the contents. Something of the kind is given in the Iron and Steel Institute's volumes and in "Nature's" reviews of the literature of science. For many years until I left for India I reviewed the metallurgical works on iron and steel for "Nature." The small fee paid is not the attraction though it establishes agreeable relationships, but there is a fascination about it which seems to enable them to get good men to do the work. There is the honour of being chosen and the freedom of being allowed to say what you think. The pamphlets should be written for the benefit of the reader, not for the safety of the writer. Longmuir and I in our book on 'Foundry Practice' braved the criticism of the censorious by publishing in our chapter on pyrometry approximate prices of the pyrometers we had used and described and the names of the firms from whom they could be obtained as the subject was then so new for the foundry that we felt it would not be much use to the manager if he did not have some idea of prices whether it was a penny cone or a twenty guinea optical and where he could get the thing when he had decided what he would risk on a trial. I remember being delighted to find that one of the best practical big gun hardeners of the old school that I knew had taken to carrying an optical pyrometer with him to his giddy height to check his judgment by his well trained eyes.

Qs. 89 and 90.—For structural steel, rails, fishplates and a few other items this system has been in successful operation in Sakchi for nearly four years. It is conducted as part of the ordinary work of my department under the control of the Railway Board and is, I think, well known to the trade. Certificates of quality.

Q. 96.—Partnerships should be freely disclosed so that it is known with whom one is trading. Registration of partnerships.

Q. 104.—The whole trend of my replies will show my conviction that it pays a country to obtain as much, as accurate and as detailed information as possible and to make it easily available. Unless in very special cases the development should be left to private enterprise but hastened or encouraged by Government. Mining and Prospecting rules.

Jail competition.

Q. 109.—I have always considered that it is a fallacy that prisoners should not be put to hard and useful labour. It seems to me that it gives those who have good in them a chance of reforming and becoming valuable members of society. It is a delicate question but if jail authorities sell at market prices the industries should be capable of being organised so as not to be injurious to the community.

ORAL EVIDENCE, 11TH DECEMBER 1916.

President.—Q. You say that when Government officials are lent to do any research work on behalf of private firms, publication should be allowed "unless they could show that it would be detrimental to their business interests, and then only to stay publication for a maximum of three years." If publication is through the ordinary Government medium, is it necessary to define any maximum at all? Generally the Government publications give a fair time to the company to get a start?—A. The name of the works should not be mentioned if the firm objects to it being given.

Q. No, but he realises that if the research is conducted on his works, he would get a great advantage; he would get over the difficult stage between research and actual practice, and so obtain a sufficient start; and Government by publishing results would satisfy the public that nothing was being held back?—A. I put three years as a maximum. In my own case I found that a year was about all the time wanted.

Q. The people who own the works and are in touch with the research going on really have a great advantage?—A. Yes.

Q. When I was in Madras I heard a story to this effect that Government were allowing the steel produced at Sakchi to be passed at a lower standard than was accepted in England for rails, and the insinuation was that this was done purposely, to give the Tata Iron and Steel Company an unusually good chance. I should like to know from you how the standard adopted by you compares with the standard specified at home?—A. The standard adopted by us for inspection purposes is the standard that is given out by the consulting engineer for the Indian State Railways, and other Railways may accept that standard or not, as they please, but one railway may have a different standard of their own which has nothing to do with India or with the home standard; it is simply their standard.

Q. Your standard then is the same as the English standard, or at any rate the same standard adopted by the India Office for Indian State Railways?—A. Yes, and other railways have their own specification. Different railways have different specifications; that has nothing to do with India or with any other place.

Q. Then I have been told the converse story that your method of inspection is more rigid than that adopted by English inspectors for English companies; is that so?—A. I think if you will take the mean of these two, you will get just about the right thing.

Q. Why should I take the mean when you have told me that the standard is just the same?—A. You have had one tale that the standard is very much easier, and you have had the other tale that the standard is more severe. If you take the mean you will find out what is just about right. I have given you the plain statement that it is the same.

Q. Do they, as in England, take a sample from the actual steel and trace it right through the works until you come to the rail and test the rail also?—A. It used to be one rail in 500 tons, but it has been changed to one in 100 tons.

Q. Is that method adopted generally at home?—A. Oh, yes; that is the general practice.

Q. That is to say, samples are also taken from the molten steel as well as from the rail?—A. Yes, so far as I know.

Q. Is that the practice in England?—A. Yes.

Q. I suppose with an established iron and steel works, the number of actual tests made might safely be reduced when you know the works have reached the requisite standard of regular production?—A. Yes, that might be so. You judge by the general quality of work of the people.

Q. Are you given latitude as to the number of tests you shall make, or does the specification rigidly force you to take a certain number of tests from the molten steel as well as from the rails?—A. The specification lays that down.

Q. And you have to take certain tests?—A. That is what I have to do.

Q. So that one can safely say that the test is exactly the same?—A. For all practical purposes. No two human beings can do a piece of work exactly the same, but so far as the specification can make the inspector do the same, they are the same.

Q. With regard to the employment of metallurgists, you speak as if there was room in India for the employment of only one or two metallurgists?—A. I am speaking of an iron and steel metallurgist.

Q. Is it not possible that we might require in India metallurgists for other base metals and for metallurgical research work generally; would it not be better if we had part of a chemical department devoted to metallurgy?—A. I hope you will never have a metallurgical department as part of chemical department. It must be separate, or you are doomed to failure. I would not have pure chemists mixed up with metallurgy, not even in research work.

Q. You mean that you would not have your metallurgist in your chemical department; you don't mean you won't have a chemical department?—A. You must have a chemical department; the modern metallurgist is first of all a chemist.

Q. That is why I suggest that the metallurgist should form part of the chemical department?—A. Then he is doomed to failure at once.

Q. You would like a chemical department and a metallurgical department separately?—A. I am not saying I would like either of them. The thing is that the metallurgist must be responsible to some one as high up as possible in Government, and must not be part of a pure science department, otherwise he would be doomed.

Q. It would be essentially a department for applied chemistry?—A. You want my opinion, and you want it on the basis of my experience. I have been through it, and am not theorising.

Q. Where were you as a metallurgist forming part of a chemical department?—A. I was not, but I know of one.

Q. Where did you know one?—A. I am not going to say that, but you know the places as well as I do.

Q. Suppose there were a chemical department of the Government of India, with 100 or 150 chemists and between 15 and 20 metallurgists. If you had such a chemical department, the chief chemist would of course be—from the official point of view—a 'big bug.' If, however, you have a separate metallurgical department, the head metallurgist would not be of the same official dimensions and would be likely to suffer unless he has a chief who is in a sufficiently good position to stick up for the rights of metallurgy. There is much work to be done also in the metallurgy of minerals, copper, etc., and for that we want metallurgical chemists?—A. All my evidence is dealing with iron and steel; I am a specialist in iron and steel.

Q. If you had a single metallurgist in iron and steel, or, say, two, it would be a little bit difficult to give them positions in India as part of a department, and give them the opportunity of rising to a post to which any first-class metallurgist would hope to rise, unless he was part of a bigger department, and could ultimately obtain an administrative position?—A. I have been through it all. That does not alter my opinion in the slightest. I would rather have an isolated metallurgical department, of whatever size it may be, and you want a first-class man for this work.

Q. How are you going to get the junior man, unless there is some prospect for him to look to; if there is only one man ahead of him, there is no prospect of his rising to that man's post?—A. I have not thought of that. I have given you my experience. Until you have that man independent of the chemical department, you are doomed to failure.

Q. At present you are employed on a temporary agreement?—A. I am not employed as metallurgist to the Government of India; I am employed as Metallurgical Inspector to the Government of India.

Q. Don't you think the two might be combined very well?—A. Most certainly. They use me as a metallurgist when they require that kind of work.

Q. Then there would be room for a bigger department?—A. Yes.

Q. But if one provides a little department for every sub-division of a subject, how many departments would we have, and who would control them?—A. I don't know.

Q. You have a suggestion in your evidence that short-time men should be brought out. The short-time men are said never to have the interests of the country or firm at heart and even in your case you are looking forward shortly to taking up a consulting post at home?—A. Yes, look at my age. My interests have been the interests of this country while I have been here; absolutely.

Q. We want to look forward to long and continued service for every good man we get?—A. It is not necessary for him to look forward. A man in my position has to make and keep his reputation.

Q. Instead of getting out short-time men, would it be possible to have a system of fellowships or scholarships for men of the assistant lecturer class to come out for two or three years, with scholarships of £250 a year, so that from among these we would be able to recruit men for the scientific departments?—A. We find a great deal of inconvenience in employing men for 5 years. Sometimes you get a young man who is very keen and instead of doing the mechanical work required of him—as every official must do—he is occupied in publishing papers which will get him a good name for a better post somewhere else. There is a great deal of mechanical work to be done, and someone must do it. That is one of the reasons why short-time appointments have not been successful.

Q. Do you think we can get over this difficulty by a system of scholarships or fellowships?—A. I could not say. My idea was to bring out men who had made their reputation.

Q. You have gone right through the history of the Tata Iron and Steel Company, you have been there from the beginning?—A. From the beginning of production.

Q. Can you tell us, for instance, about the troubles that were first met with in connection with basic steel manufacture, and how the troubles were overcome?—A. Yes. That is one point that I think would be of interest to you in connection with the various questions you are.

taking up. First of all there were a number of German steel makers brought in, and as they were not producing material for Government inspection, I was not kept very busy at that time. I looked round and found that they were working on what I considered to be wrong lines. The firm were seriously considering shutting down the steel plant altogether, and the Government asked me whether I could put things right. I said that I could and I was lent for the purpose to the Tata Iron and Steel Company, I changed the system of manufacture from what I considered to be a wrong one into the correct system in my opinion for this country and for the men that were here, and that, with slight differences, has been the system that is used up to the present time.

Q. Successfully?—A. Successfully, and the slight differences are not, in my opinion, improvements.

Q. Going to Germany for the methods, the men and the machinery was mistaken policy?—A. I think so. That is one of the things I would like to mention here. In the speech that Sir Dorabji Tata made recently he gave credit for the basic open hearth to Germany, as a German speciality. As a recognised expert I say that that is simply not the case; that the basic open hearth is a truly English process.

Q. It is British in origin, in any case?—A. Yes, and British in working up. The basic process was brought out by Thomas and Gilchrist. It was also worked out practically and made extensive use of, and the only thing Germany did was to take it up and use it also. Before she was taught by Great Britain she had not the ghost of an idea how to do it. Far from being a German speciality it is a British speciality in that it was brought out by Britain and carried to a successful issue, scientific, theoretical and commercial.

Mr. C. E. Low.—Q. You speak of the assistance given by the Sheffield University to industries; how was that managed; under what terms and by what arrangement do the Sheffield people do a piece of research, say, for a firm?—A. It has not been very much on those lines; it has been in this way; the department of applied science of the university conducted researches originally for the simple reason that the things were not known, and if we had to teach them to somebody, we had first to find them out, and during these researches men were trained who enabled the University and Sheffield to keep in the forefront in regard to the making of the special steels for which Sheffield is famous.

Q. Have you had any investigations of the sort where a firm has asked you to take up special research on their account?—A. Not much of it, because we have trained men to skill in research, who have been able to do it themselves. Many of my old students have worked out very splendid work in that way, coming to us for help and advice, and keeping in touch all the time. I might mention that the firms find that it pays them to keep, not a research man but a research department. You will see the kind of man they want when on my way home on leave recently I was cabled the offer to stay at home as head of the research department of a firm.

Q. How many men do such a department take?—A. I think they have about 14 men in the particular place I allude to, who have absolutely no manufacturing responsibilities.

Dr. F. Hopkinson.—Q. Are you quoting the numbers at Hadfield?—A. The whole works is a research department at Hadfields. It is not a normal case. Theirs is a research department which paid 25 per cent. in normal times.

Mr. C. E. Low.—Q. Is there a research department in Tata's Steel works?—A. No, "not yet," Sir Dorabji says.

Q. How was it that England left the tungsten steel business to Germany, as she did?—A. That is not quite correct. England never let the high-speed or tungsten steel business out of her hands.

Q. There were people in Germany making it?—A. You could not count on the fingers of your two hands the firms that were making high-speed or tungsten steel in Sheffield before the war.

Q. Our information out here is that most of the tungsten was exported to Germany?—A. Ah, tungsten! You are quite right that they allowed the manufacture of tungsten to go into Germany.

Q. You cannot get tungsten steel without making tungsten?

President.—Q. The fact is that wolfram went to Germany, and tungsten was made in Germany. This tungsten was practically purchased in England for the manufacture of tungsten steel. Mr. Low wanted to know why tungsten steel went out of the country?—A. That is not the case.

Q. As you are not interested in tungsten but only in tungsten steel, he does not ask the supplementary question as to why tungsten went out?—A. May I just sum it up? The point is that tungsten steel has been made in Sheffield in enormous quantities beginning about 1870, and they only allowed the manufacture of tungsten to go, but tungsten steels require the exercise of great skill in mixing, melting forging and heat treating and that skill seems to be centred in Sheffield more than anywhere else.

Mr. C. E. Low.—Q. That does not interest us so much, but the point we are after is this. What are we to do to prevent the tungsten ore going to Germany in future?—A. (No reply was elicited from witness.)

Q. In your answer to question 17 you say that private firms or companies should pay for the services of the Government experts. You are considering there Government experts in an advisory capacity?—A. Yes.

Q. You don't contemplate the case, as we have to do in this Commission, of Government lending the services of an expert in an executive capacity, as a responsible manager?—A. In any case I say firms ought to pay.

Q. Do you think there will be any difficulty, supposing Government lent the services of an expert as manager of a department of a firm, in regard to control?—A. Yes. There would be difficulty. As an expert lent to a firm as manager of a department, I should have my way or give the thing up.

Q. You say there would be difficulty; how could that be got over?—A. I am only thinking of the one case; taking the steel business, if you don't have your way in it, you might as well go out.

Q. If the firm asked for the services of such a man, it would definitely have to recognise that he was boss of his own job entirely?—A. It must be so, otherwise he could not work to a successful issue.

Q. In your answer to questions 25, 26 and 27, you say the Geological Survey would search for deposits in the way they do at present. Do you contemplate their carrying the process any further than they carry it at present, i.e., giving more knowledge than at present about the probable extent and nature of the deposit?—A. I am afraid I am not sufficiently acquainted with how far they carry it at present. I merely state the position, and practically the whole of my evidence may be taken that it pays a country to get reliable practical information in whatever way they can, and that kind of information could be obtained by the Geological Survey, but not to hamper them to get detailed information. For example, they got the information about the Gurumaishini iron ore.

President.—Q. Do you mean that the Geological Department should not go any further than establish what is known as a prospecting proposition, and then the actual proving of the ground should be done by private owners?—A. Yes, that is exactly it.

Hon'ble Pandit M. M. Malaviya.—Q. You say with justifiable patriotic pride that Germany learnt the system of the open hearth from you?—A. From Great Britain.

Q. And so did the Americans?—A. Yes.

Q. But is it not a fact that now this open hearth system is practised more in Germany and Austria than in England; are you not following the Bessemer system more and more in England?—A. No.

Q. Do you mean that the open hearth system is not more followed in Germany than in England?—A. The general tendency all over America is to go to the open hearth. There are two systems and you can work by either, the acid and the basic systems, but there is a tendency to go from the Bessemer to the open hearth.

Q. So that now in England the tendency is quite as great as in America and Germany to go to the open hearth system?—A. Practically all over the world. It is the general tendency in the whole world.

Q. You suggest here that "if Government gives some very substantial help, they should stipulate that if possible the general manager of the works or head of the community should be a subject of the British Empire, and there ought to be an understanding that unless good cause could be shown, purchases of plant should be made within the Empire." Of course putting aside these present deplorable war conditions, would you lay down such a proposition in those broad words at the present moment, or wait to see the fiscal policy of the Government when the same is decided?—A. I foresaw this long ago; it has nothing to do with the war whatever.

Q. Of course some countries excel in one kind of machinery and some in other kinds of machinery. Suppose you want to develop the match industry and you import match machinery from Germany, would it not be better in that case from the commercial point of view to bring out Germans to work that machinery?—A. The last sentence of that paragraph reads, "It is an obvious extension of the same principle to buy British Empire goods when reasonable."

Q. That is perfectly intelligible. I only want to be instructed about the practical facilities for carrying out your proposal. Take for instance America. Suppose you have got some machinery made in America, in which America excels; and suppose it is desirable, from a commercial point of view, to produce cheaper goods in order to compete with foreign goods, it is obviously desirable that we should get the best machinery in the world, and it may be necessary to engage workmen who are familiar with that machinery in order to work it, or set it up and work it in the first instance; in that case the restriction which you suggest would work to the detriment of the Indian industry?—A. I think all the conditions you have mentioned would make it fairly reasonable, so it comes in the end of my paragraph "when reasonable."

Q. So that you would not make it a general hard-and-fast rule, but would make it a recommendation?—A. That is clearly stated in my paragraph. I don't think it could be clearer. The firm would bring up their reasons in that case.

Q. Would you require some restrictions; would it not be better to give freedom to the promoters of the company to obtain such machinery as they think best, and to obtain such technical assistance as they think fit?—A. I don't like using the word "hampers;" that is not within the meaning of my paragraph. I would not do anything to hamper any industry at all; and if they are so thoroughly well up in the thing that they can make these decisions, I think they should be so well up in it that they ought not to ask for Government help.

Q. But no trade can be so well up as to dispense altogether with Government patronage; it may do without Government help. The trade of no country can do without Government patronage. Suppose Government patronises the products of an Indian firm; would you insist that the conditions mentioned here should apply, say, to a match factory, if it received Government patronage?—A. It would not apply where Government was buying the matches in the open market, but if they guaranteed purchase—I am speaking of iron and steel all the while—then it would apply. You are starting this match factory, you put your matches on the market and Government buys them because they think them better at the price than anybody else's, that has nothing to do either with you or with Government; but if you ask Government to guarantee to buy a million and a half pounds worth of your matches within the next ten years, then you come under my paragraph.

Q. You know that Government has laid down a definite policy that they will encourage indigenous goods within certain conditions. That being the policy, every industry that lives and thrives in this country is likely, generally speaking, to receive some Government patronage?—A. In what way; in my first way or second way?

Q. In the way that I suggest; that Government encourages it in purchasing its products, where it has to buy its products; not because of the guarantee you mention, but in pursuance of the general policy that Government will encourage indigenous industries by purchasing indigenous goods. In that case it will be a case of Government patronising the industry, and putting aside the question of the amount or value of the purchase money, the question of principle would be the same?—A. Once every year the Government would simply buy or not, as they thought fit, on the particular condition of this match industry that you are running; but that is a very different matter to saying that whenever you are making steel up to quality, then we will buy so much value per annum, for ten years from you, these are two different things. Then it is merely an extension of Swadeshi to the Empire.

Q. You see the Government has laid down the policy that it will encourage indigenous goods if they are fairly equal to the foreign goods which are imported, and if the price is also reasonable. Suppose the Americans are making steel quite as good and cheaper than the Indians; then the Government cannot under that policy purchase Indian steel howsoever much it may desire it, until it changes that policy. Supposing that by purchasing machinery from one particular country, say, America—America has been producing machinery cheaper and it may be as good as English—suppose it is—I will give you a concrete case; for instance, in the case of ice-making; there was a factory in Delhi which worked with machinery which was not American. Shortly after a gentlemen bought American machinery, and it began to make ice so cheap that it was sold at a quarter of the price of the other factory's ice. There is no restriction on anybody in the world coming to India and establishing a firm. Suppose the Americans come and establish a steel trade in India and are able to make goods cheap. The Government, if they paid a higher price for the Indian-made article, would cause a loss to the tax-payer, so that if the Government were to take the interests of the tax-payer it ought to purchase things made by the American firm. How would that work? But if an Indian firm finds that it is more profitable to import American machinery, in order to enable it to compete with American products, and in the beginning gets American men to work it, would you not encourage the industry in order that it should establish itself in this country?—A. That is entirely the spirit of my evidence. I think that would be most reasonable. You are not saying anything different from the tone of my evidence.

Q. I want to make it clear that the condition that you have recommended cannot be of general application; its application must be determined by the special circumstances of each case?—A. Of course that is perfectly clear in my evidence, "it is an obvious extension of the same principle to buy British Empire goods when reasonable."

Q. Things made in the Empire don't stand on the same footing as far as India is concerned as things made in the United Kingdom, because the political relations of India with the colonies are not as good as those with the United Kingdom; so I think you will qualify your remarks so far as the Empire is concerned?—A. That is beyond me; I am not a politician, I am only a metallurgist.

Q. You said that you had students at Sheffield; am I right in thinking that you were at the Sheffield University as a professor?—A. That is so.

Q. For many years?—A. Yes, but not as a professor all the time.

Q. I understand you to say that technological colleges should be established in this country?—A. I don't say that they should be established; I say if men are to be trained.

Q. You have no decided opinion as to whether they should or should not be?—A. No, that is not in my line.

Q. Assuming that it is considered necessary, in view of the steel trade that is growing; are you or are you not of opinion that it is desirable to train men in this country instead of

relying upon importing men from outside?—A. I think that is quite clear in my answer. I took a very long time over this to make it as clear as possible.

Q. I take it that in answering questions 64 to 74, you have kept the University of Sheffield before your mind. With those clearly laid down qualifications, do you think that there will be any difficulty in establishing a technological college at Sakchi to train up men who might take up the work of supervisors and superintendents at the steel works at Sakchi?—A. We are working at that privately.

Q. You say, "One part of our laboratories in the University of Sheffield is practically a works in miniature, making single heats up to 2½ tons, where correct methods can be studied, inferior methods done to show why they are inferior, and new ideas tried at a comparatively small cost." Do you think that with similar works being made a part of the technological institute, training of a higher kind could be imparted at Sakchi?—A. For the supervisors, but not yet for the superintendents.

Q. In your opinion would the men whom you would turn out as supervisors at the college I am talking about, receive the finishing touch by a year or two or three years' stay in England?—A. Yes.

Q. Then they could be entrusted with the work of superintendents?—A. That does not follow.

Q. Not necessarily, but if the man has it in him, these three years' training will complete his education as a metallurgical engineer?—A. Oh no, he must come into the works and begin.

Q. That is why I ask you about the works. You have some works attached to the Sheffield University; you give a man a training there in theory and practice; then you put him into other works and let him work for some time?—A. No, he sees to himself; then he goes and finds a post in the commercial works.

Q. And after some time in the works you would send him on to England. After you have put a young man through a theoretical and practical course at a University or technological institute, founded on the lines of Sheffield, would you send him to England to complete his education in two or three years, or do you think he will be good enough to get on here and gather experience of work at Sakchi, and rise in time to be a superintendent without going out?—A. That is a very big question.

President.—Q. You contemplate having this technological college at Sakchi; would you take a young man in at 19?—A. We would take him in at 16.

Q. Then give him three years' training?—A. Yes.

Q. After three years' training would you want him to go through the works at Sakchi before going to England?—A. There is one type of remark in all these questions that jars on me; "you put him through," "you send him here," "you push him there," and so on. That is absolutely opposed to my system of training. We provided the facilities and the young man came to us, did the work, went out into the world, found a post and did things.

Hon'ble Pandit M. M. Malaviya.—Q. You put the idea into his head?—A. Yes. He could go into the works there, but of course it would have a broadening effect for him to go out and get into other works.

President.—Q. It would be better to go into the works first, or go home?—A. No, he should go home right away if he was going. You will remember we are assuming that the technological college will be in Sakchi and he would be about the works all the time.

Hon'ble Pandit M. M. Malaviya.—Q. You say in answer to question 17, "Private firms or companies should pay for the services of the Government experts," and that "all firms ought to pay, and that is the way to make them begin to appreciate the value of the help." You are aware that in many matters the Government has helped industries, and the help has been beneficial. For instance in indigo, sugar, cotton and silk. You don't mean to suggest that these firms should have to pay for any problem that they may send up to the research institute, for which the Government might think it fit to depute one of its experts?—A. There are two points of view; one where the expert is asked to come down to the works, take up a certain difficulty and clear it up. For that the Government expert ought to be paid by the firm. There is another point of view, where Government have decided that a certain piece of experimental work should be done for the good of the community at large, and they either do or do not take advantage of a particular works that is in existence. In that case the Government would pay the cost of the experiment for the general good. These are two quite distinct types.

Q. It is only in a case where a problem, special to a private firm, is to be dealt with that you would wish the firm to pay?—A. Yes.

Hon'ble Sir Fuzulbhoy Currimbhoy.—Q. When you wrote your reply to question 6, were you aware that the Tatas did their best to get blast furnaces from England, but failed, and so had to go to other countries?—A. I am not aware of that.

Q. In 1909 they tried their best to get the blast furnaces and had to go to Germany and got them at 10 per cent. less. With their manager too they did their best and could not get a man, and had to go to America. In these circumstances you have made it clear that if these difficulties occur, that they be allowed to do so?—A. If these difficulties have occurred, then it is reasonable.

Q. Then you say, "it is rightly one of the tenets of these firms that the purchase of Indian goods should be encouraged." I am sure you are aware that Indian railways had to buy their rails through the home authorities; although they could get the thing in India. In that case, don't you think that a firm like the Tata Iron and Steel Company is not commercially treated well? You want them to purchase their plant from within the Empire, and at the same time allow the Indian railways to indent their rails from England, when they could have very well got them from here?—A. The Tatas have sold all the rails they made.

Q. In the beginning they had a lot of difficulty to sell outside?—A. But you must understand that no firm in England will get what the Tatas got; the promise to take their rails. You have to establish your reputation before you get a State order at home.

Q. The materials pass your specification. What more do you want?—A. That question gives me the opportunity of explaining a point that is of great importance. I have met many people who seem to think that if a thing passes the specification it is as good as it can be. It must be remembered that of materials that pass the specification there are all grades from those that just pass up to any degree of excellence above that. Some firms take little notice of specifications on certain materials, but making theirs to be sure to pass do much more than that for the sake of their own reputation. The fact that two firms both make materials that pass the specification does not mean these firms make materials of equal quality.

Sir D. J. Tata.—Q. You have just said that it roused your anger to find the Chairman of the Tata Iron and Steel Company in his speech had made certain remarks about German open hearth furnaces. You object to my having said that open hearth furnaces are a German speciality. I am sorry to find that you took the expression "a German speciality" to mean that they originated in Germany. To explain what I mean when I speak of "a German speciality" I would ask: is it not true that in Germany they use the open hearth process more than the Bessemer process, and that Germany makes a speciality of the open hearth as against the Bessemer process?—A. In Great Britain they use both processes, and you are not going to take the question as a matter of weight or tonnage.

Q. What tonnage do they make in England by the Bessemer process and what by the open hearth; which is the greater? When I say that it is a German speciality what I mean is that the open hearth was practically more used in Germany than in England, and that consequently more men trained in the open hearth process were available there than anywhere else. We might not have been able to get them in England so easily. I did not suggest that open hearth furnaces were not originated in England, or that they originated in Germany. I might say that the dye industry is a German speciality, though I know that the whole of it originated in England, but the Germans made a speciality of practising it. England is now making great efforts to retrieve her position. This is what I mean by a German speciality. I do not say that England knew nothing about the open hearth system, but that the practice of the open hearth system is greater in Germany than in England?—A. You give the dye industry as an illustration. The dye industry was one that was brought out in England. Then it was allowed to go to Germany, and they took it up and practised it. That is not the case with the basic open hearth process. It is practised to a very large extent and with success commercially in England, and it is not in any sense of the word a German speciality like the dye trade.

Q. But it is not followed in England to the same extent as in Germany. Germany is almost exclusively basic?—A. Because they cannot get any ore for anything else.

Q. In America, where both systems are practised, the rails made on the basic system are, I understand, preferred to those made on the Bessemer system, and they charge 2 dollars more for the basic than the Bessemer steel?—A. That again is giving a wrong impression.

Q. With reference to the evidence given by Mr. Tutwiler, I would like to ask one question. He has been at Sakchi for some time now, and there have been statements made that at Sakchi Indians do not receive any encouragement with regard to employment. You have been there and know the treatment that Indians receive, and what they are doing there. Have you any experience in that connection which you would like to relate to us, especially with regard to Mr. Tutwiler's attempts to teach Indian employes?—A. So far as Mr. Tutwiler is concerned, he has done more to employ Indians in more responsible posts than any other man. That is an undoubted fact, not an opinion.

President.—Q. I presume that if there had been any other general manager, and the works had attained the present state of evolution, the other manager would have done the same. Is it a fair statement that Indians have not been given a fair chance?—A. No, so far as I know.

Q. The statement has been made publicly that the employment of Indians at Sakchi is only pretence. In your opinion is it perfectly true that Indians have been more largely employed and have displaced a certain number of Europeans?—A. Yes, they have been more and more employed.

Q. And you are satisfied that some very satisfactory results have been obtained by the change?—A. I don't think that in one particular department where they are almost exclusively employed the standard is quite as high as it was when there was European labour.

Q. Possibly the change in that department has been a little rapid?—A. Possibly.

Q. In view of what you have seen at Sakchi, do you feel that there is reasonable hope of employing Indians in large numbers for work of that kind, that they are really accommodating

themselves to the new conditions satisfactorily?—A. Yes, so far as they are employed at the present time.

Dr. E. Hopkinson.—Q. Where do you carry out your manufacturing tests for the Government of India?—A. We have an island site on Government ground within the Tata works.

Q. There is no independent laboratory?—A. It is an independent laboratory. The ground we work on is Government ground.

Q. Only mechanical tests are carried on there?—A. No, all the tests.

Q. Are the British standards adopted by the Government of India?—A. For structural steel the British standard is adopted by most firms ordering. There is still one railway that adopts the Indian State Railway standard. The British standard specification for rails does not apply to the basic open hearth at all. It is the Railway Board's or Indian State Railway's standard specification that is used.

Q. You approve of indigenous industries like the Tata Iron and Steel Company but insist upon the necessity of Government guaranteeing orders, provided that the goods are up to specification?—A. Yes, I approve, but I have nothing to do with Government guaranteeing orders.

Q. But you don't make any reference as to the question of price?—A. It must be at the same price. The agreement with regard to that in normal times is at the price of the home market plus freight, etc.

Q. That is the case in your reference to it here?—A. Yes, the price is guided by the prices in the market c. i. f. Calcutta.

Q. No advantage is given them as regards price?—A. None whatever.

Q. You speak of your experience at Sheffield, and say that university was throttled by Government?—A. That was over 20 years ago.

Q. If you can, in a couple of sentences, kindly explain what you mean?—A. We were given, as stated a small grant-in-aid. We were then at the beginning of things. In return for that we had to work to a standard form which was not suitable to the district at all, and was very ancient. We found that that throttled us. A number of our men put their heads together and said, "Let us tell the Government to keep their grant-in-aid."

Q. What do you mean by a "standard form"?—A. If you were teaching metallurgy in Sheffield, you would have to teach it on the same lines as everywhere else in the United Kingdom.

President.—Q. The Government does not lay down any standard for the university?—A. This was when we were Firth College.

Dr. E. Hopkinson.—Q. You say in answer to question 50, "Industrial schools should be under a Department of Industries." Do you include in industrial schools, technical colleges and technical schools?—A. The industrial schools are of a type which try to teach a man the elements of a trade outside the part he is doing in the works. The technological college, I don't know what you would put it under. At home in some cases it is put under the City Council.

Q. You don't suggest that it should be so in India?—A. I am not well enough informed to express an opinion. When it is put under the Department of General Education it is so far distant from their principal work that it cannot get its views considered.

President.—Q. Dr. Hopkinson wants to know whether in addition to the industrial school teaching trade, you would put the technical school under the Department of Industry?—A. I do not know the system of Government here, and I meant that at any rate it should be under the ordinary Department of Industries.

Dr. E. Hopkinson.—Q. You would not have the technical school under the Department of Education?—A. No.

Q. Nor a technological college in which research work is carried on?—A. No, I would still have it away from the Department of Elementary Education.

Q. I fail to understand your answer to question 51?—A. It is considered to be rather a mystery in designing, i. e., the getting up of the buildings of a technical college, designing them and putting the plant in.

Q. You refer to buildings and equipment?—A. Yes. It is not very difficult either deciding that you will have this and that professor. The difficulty is in getting the right professor. I have seen some very good work done with poor material when you had good men. If you want your technical college to be a success, it is not the building and equipment and design of how many professors you will have that is difficult, but it is getting the right man to carry out ideas properly.

Q. I understand now that you consider the difficulty lies in designing a professor?—A. It is not very difficult to design the nature or number of the professors you are going to have.

Q. In reference to question 77, would you go so far as to say that the Government of India ought to allow its expert officers extra leave to bring themselves up-to-date from time to time?—A. I am afraid that I was thinking of a case such as mine where the leave was inadequate for this purpose. I only get three months leave in three years. It would have to be special leave for that particular purpose.

Q. Without conditions ; simply to bring himself up-to-date ?—A. They would have to show cause. I was sent for a particular purpose and had to make a programme which had to be passed by the authorities. It has, I understand, been done in the Geological Survey of India for a number of years.

WITNESS No. 132.

Dr. H. H.
Hayden.

DR. H. H. HAYDEN, C.I.E., *Director, Geological Survey of India.*

WRITTEN EVIDENCE.

Technical aid to
industries.

Qs. 15 & 16.—The Geological Survey has always kept well in view the economic aspects of its work, but it is only in comparatively recent years that circumstances have arisen which have led the department to take the prominent place that it now occupies in the matter of advice and assistance towards the development of the mineral resources of India. In the year 1903 the Director saw that the time had come for a policy of active co-operation with those interested in mineral enterprise. He introduced a well-defined system of interpretation and co-ordination of the researches carried out by the members of his department, with the object of bringing prominently before the public the value of the mineral resources of India, many of which were either lying untouched or were being only inadequately developed ; and he took steps to collect and issue in a concise and simple form facts and figures relating to existing and potential mineral industries.

A characteristic feature of the policy of the Geological Survey throughout the history of the department has been the active operations undertaken from time to time with Government funds either with a view to assisting existing industries or to developing new ones. As one of several instances of this policy, I may cite the boring operations carried out by the Geological Survey in the Singhbhum copper belt, which have led to the mining operations now proceeding in that area.

In addition to carrying out specific investigations, the members of the Geological Survey are constantly called on for technical information. This is freely given, both by correspondence from headquarters and also personally by officers when in the field. In special cases (*e.g.*, wolfram mining in Burma) opinions and advice are also given ; but assistance of this kind is rendered on the understanding that it shall be used only for legitimate purposes.

Q. 17.—It has not been customary to lend the services of officers of the department to private companies or firms, although this has been done on rare occasions ; in such cases the results of the investigations ought, I think, to be communicated to Government, the communication being, if necessary, treated as confidential ; the results, however, should be published where such a course is compatible with a due regard for the legitimate interests of the firm or company concerned.

Q. 18.—It would be difficult, if not impossible, to lay down any hard-and-fast rule on this subject, and each case must be treated on its own merits.

Research abroad.

Q. 21.—With a cadre so small as that of the Geological Survey it is impossible to deal with all the problems that arise in connection with the mineral industries of this country. Attention has necessarily been directed to the more pressing questions, and assistance has also been sought from external sources, such as the scientific and technical department of the Imperial Institute. Specimens have been referred to the latter department from time to time for analysis and for opinion on the prospects of their successful use for industrial purposes. The results of those references have not been satisfactory, partly owing to the long delay before replies were received, and partly to the fact that the information supplied has not always been correct. This latter is a serious drawback, for it destroys confidence in all information communicated. The failure to quote authorities for "expert" opinions has also been a cause of complaint. The Geological Survey has therefore ceased for some time past to make use of the scientific and technical department of the Imperial Institute, and in recent years we have referred to mineral brokers for information and have sent analytical work that we could not undertake ourselves to professional analytical chemists.

The above disadvantages of the Imperial Institute could no doubt be obviated, except in so far as the first might be due to a greater amount of work than the staff were able to cope with. If they were remedied, we could again avail ourselves of the services of the department not only for information generally but also for specific researches which require special apparatus or conditions not to be found at present in India. Such a department with headquarters in London has unusual facilities for keeping abreast of unpublished developments of industrial processes and in touch with the British and Continental mineral markets.

Qs. 22 & 24.—The necessity for the despatch of materials to the Imperial Institute or elsewhere would be largely obviated if a greater amount of scientific and industrial research could be done in this country. Much, I think, might be done by co-ordination of the facilities afforded by the various educational institutions, but I will refer to this more fully below under "Co-ordination of research." At the same time there would be certain advantages in having an intermediary—whether a department of the Imperial Institute or any other body—in

England to which we could send bulk samples of Indian minerals for working tests on a commercial scale by appropriate industrial concerns. It is possible that the Advisory Council for Research in the United Kingdom might undertake this duty but the actual channel through which samples should be distributed is a matter of detail so long as it is efficient. Beyond this aspect of industrial research, which in certain cases, could not be dealt with in India, I would like to see all our work done in this country. In that case, however, co-ordination would be essential, and it would be necessary to form some body corresponding to the Advisory Council for Research in the United Kingdom to undertake that duty.

Qs. 25 & 26.—Although a great deal has been done since the creation of the Geological Survey towards the investigation of the mineral resources of the Indian Empire, much still remains. The lines on which the Geological Survey works are well known, and it is not necessary for me to define them in detail.* The primary object in view is the completion of the geological map of India. This involves a systematic survey of the whole country, and naturally includes a systematic mineral survey, all occurrences of minerals of economic value being recorded on the geological map. In view of the small cadre of the department, it is inevitable that the completion of the geological map, and of the concurrent mineral survey, should be still far distant. Surveys for industrial purposes.

Q. 26.—The ultimate aim of the systematic survey is the development of the mineral resources of the country, and it has not unfrequently been suggested that the staff of the Geological Survey, instead of carrying out that systematic work, should devote its energies to looking for minerals of economic value. To anyone acquainted with the subject the wastefulness of employing a geological staff merely as an army of prospectors is self-evident, but the suggestion has been seriously put forward so frequently that it is necessary to emphasise the unwisdom of such a course, which must result in the dissipation of the energies of the staff. The majority of the staff of the Geological Survey, therefore, is employed on systematic work, but at the same time a certain proportion is set aside to carry out specific economic investigations likely to yield results of more or less immediate value. The more important minerals known to be of industrial value and to occur in considerable quantities in India have been taken up individually, their occurrence studied, and monographs prepared on them. These monographs are published as memoirs, and are readily accessible to the general public.

In addition to the officers employed on systematic survey and those engaged on investigations relating to specific minerals of economic value, one officer is kept at headquarters in charge of the laboratory and museum and deals with specimens submitted for determination; he also assists the Director in dealing with the numerous enquiries coming in from day to day from every part of India. The above briefly represents the lines on which the Geological Survey is organised and those which, in my opinion, are the most suitable for a department of the kind in this country.

Q. 27.—The dissemination of the information collected by such a department can be readily effected by means of publications such as the *Records* and *Memoirs* of the Geological Survey.

A comparison of the cadre of the scientific departments in India with that of similar departments in any of the leading western countries shows that this country is considerably understaffed. Thus, the cadre of the Geological Survey of India is 20, that of the Geological Survey of America, about 164, while that of Great Britain is proportionately even larger, viz., 34. It is not surprising, therefore, that many problems that ought to be worked out in this country cannot be attempted. So far as geology is concerned, an important need is chemical assistance. It is only within recent years that a chemist has been added to the staff of the Geological Survey although we could profitably keep several steadily employed; for chemistry, like geology, includes many branches, and no one man can specialize in all. Organization of technical and scientific departments.

It has been suggested that the best way of meeting the needs of the country in this respect would be to create a chemical department, with a staff sufficiently large to include specialists in all branches and capable of undertaking any specific enquiry referred to it by other scientific departments of Government. Such a department would be of great value. It should be an Imperial Department analogous in constitution to the Geological Survey and subordinate to one of the departments of the Government of India. It would probably be advisable to allow it to undertake work for private individuals, although this should not be permitted to interfere with the business of firms of analytical chemists in this country. The services of officers of the department might from time to time be put at the disposal of Local Governments or of other departments (*Q. 67*), but I consider it essential for efficient administration that the members of the staff should, wherever employed, remain under the control of the head of their department, and should not be transferred to Local Governments, which are not in a position to exercise the expert supervision required. Imperial Department.

Another subject to which it has not yet been possible to devote the attention it deserves in this country is that of subterranean water-supply. A certain amount of work has been done by the Geological Survey, as well as by officers attached to the various Local Governments, but this has necessarily been spasmodic and lacking in co-ordination. The subject is one which the Geological Survey has long wished to take up, and had it not been for the war, I should have approached Government on the subject some time ago; but even when the Department is at its full strength, the cadre is so small that it would be impossible Subterranean Water-supply.

* *Vide* his oral evidence for further details.

to devote the services of more than one, or at the outside, two officers to the work. The results that have been attained in Australia and America show the benefit to be derived from systematic work in this direction, and although there are large tracts of country in India which offer no prospects of any considerable subterranean water-supply, there are others, where water is badly needed, which call for examination. Mere superficial examination is not sufficient, and it would be necessary to undertake boring operations concurrently with surveys. At present work of the kind is left to Local Governments, which do not as a rule possess staffs having the expert knowledge required. The investigation is one which, I think, might advantageously be co-ordinated and undertaken by a special Imperial department or branch of an Imperial department.

Co-ordination of
research.

Qs. 21 & 74.—In addition to a new scientific department or departments to deal with branches of science at present unrepresented in this country, there should also be appointed a body to co-ordinate and deal with scientific and technical research. This in a more limited sense was the primary object in a view when the Board of Scientific Advice was created, but the present constitution of the Board is not, I think, suitable for the more extended scope now contemplated. It would no longer be merely a question of bringing into line the work of the scientific departments of Government but of co-ordinating the whole of the research work in this country wherever carried out, and therefore all the scientific and technical institutions in India would necessarily be involved (Qs. 71, 73). The nucleus for such a body might be obtained from among the members of the Board of Scientific Advice, but additional members should be chosen from the staffs of the Universities, colleges and technical institutions which are in a position to undertake research. A good field for selection would be found among the members of the Indian Science Congress (Q. 76), which either does, or should, include all the members of the Board of Scientific Advice, but membership of the advisory body should not be restricted to Government servants. The body so constituted might form an Advisory Board or Council analogous to the Advisory Council for research in the United Kingdom; it might consist of a central committee and number of smaller sub-committees, each of the latter dealing with one subject or group of allied subjects; each sub-committee should keep itself fully acquainted with all research work in its particular line being carried out in India, and should at the same time keep in touch with parallel lines of research in other parts of the world. Such a body might replace the present Board of Scientific Advice. I should not be disposed to give it executive powers, but to retain it rather as an advisory body. Problems referred to it would be communicated by the central committee to the appropriate sub-committee, which, if it considered investigation desirable, would advise as to the most suitable channel, whether in this country or abroad, through which it might be carried out.

Technological
institutions.

Reference
libraries.

Q. 72.—The various educational institutions in India should be encouraged to take up each its own line and to specialise in some particular branch of research. Such specialization would make for efficiency and economy, for individual institutions would be able to make the most of their funds in the direction of equipment both as regards apparatus and literature. There would thus be formed throughout the country a number of very complete specialized libraries (Q. 78). At the present time Calcutta is the only centre in India which can be said to have fairly complete libraries in most branches of science, and these are not particularly accessible to workers in other parts of India. The Geological Survey is exceptional in that it not only places its library at the disposal of any one who wishes to read there, but sends books to all parts of India on loan. This privilege appears to be much appreciated, and has never been abused. If the same principle were adopted by other scientific libraries, there would be less ground for complaint as to the inaccessibility of literature to those engaged in research in this country.

The suggestion made in the last paragraph with regard to specialized libraries is offered with a view to meeting the needs of those engaged in research and does not embrace the question of reference libraries for the study of science generally. More libraries of the latter class are desirable in India, and leading scientific text-books and periodicals ought to be available in at least four or five centres throughout the country (Q. 79).

General official
administration and
organisation.

I would not recommend that the suggested Advisory Board should have executive powers. (Q. 62). It would be preferable to give those to a department to be created specially to deal with industrial development and research in all their branches, and I would place under its control not only the scientific departments but also all Government institutions and laboratories in which science is taught or practised, except those engaged in medical research. I would also include among its staff specialists who could advise the Imperial and Local Governments with regard to individual industries not dealt with by the scientific departments; in this category I would include such industries as glass-making, pottery, etc. The member in charge of the department should have the highest possible scientific attainments and should at the same time have shown himself interested in the application of science to industry. The same department might conveniently be responsible also for industrial schools (Q. 50). If the latter, as well as the scientific institutions and laboratories which are now under the Education Department, were placed under the new department, complication involving questions of dual control might be expected to arise; this difficulty might perhaps be obviated by the transfer of the portfolio of Education to the member in charge of the proposed Department of Industries.

Study of foreign
methods.

Q. 77.—In order to derive full benefit from the services of the expert and scientific staff employed under a Department of Industries, it is necessary that the members should be

encouraged to keep their knowledge up-to-date. The best means to that end would be the grant of study-leave, such as is given to the Indian Medical Service and the Geological Survey. Such encouragement need not necessarily be restricted to Government employes, but might be extended, in the form of grants or scholarships to members of private industrial concerns. (Q. 52). Such grants or scholarships might replace the present system of State technical scholarships.

In the matter of collection and distribution of commercial intelligence, a direction Commercial in which development might take place with advantage, is towards making available inform- intelligence. ation as to the names of firms or individuals in India who deal in specific articles. I frequently receive mineral specimens with requests for information as to a possible market for them in this country. The Geological Survey has amassed a considerable amount of information of the kind, but it has not been possible to collect it systematically, nor is it complete. The following is an example of what is required: comparatively recently my department has received numerous samples of china-clay and has been asked to put the senders into touch with possible purchasers. In such cases it would have been convenient if there had been any source to which I could have turned for information as to all firms in India who deal in china-clay.

Among the subjects which, in my opinion, call for investigation as regards the General feasibility of establishing new mineral industries, I would mention aluminium, artificial fertilisers, sulphuric acid, alkalis, ferro-chrome, ferro-manganese, ferro-tungsten, micanite. For all these industries we have raw materials in the Indian Empire, and the aspect which seems to me to require special investigation is the financial one in each case. Such questions as arise are:—

Is there anything to prevent the Bawdwin zinc ores being reduced in the Indian Empire and their sulphur being made available in this country for the manufacture of sulphuric acid?

If acid were produced in large quantities, would it be absorbed?

Could India compete with Europe for the eastern market for sulphate of ammonia and superphosphates?

Would it not be more economical to export a part of our production of manganese chromium and wolfram in the forms of ferro-manganese, ferro-chrome and ferro-tungsten respectively?

Are conditions suitable for aluminium manufacture in this country?

Could we find a market for the metal if it were produced in large quantities?

Is it possible for India herself to produce all or any of the coal-tar products which she now imports in large quantities?

These and many similar questions involve the collection of information not available in this country, as to the conditions—as regards production, distribution, finance, etc.,—governing the industries concerned, in other parts of the world.

Q. 104.—Although many of the minerals which we possess in India are essential for industries of Imperial importance, I would not recommend that they should be developed at the expense of the State, except in cases in which there was small prospect of their being developed by private enterprise. I know of only one class of minerals which might at present be regarded as an exception, *viz.*, the radio-active minerals.

ORAL EVIDENCE, 12TH DECEMBER 1916.

President.—Q. I notice that in your written evidence you refer to the lines on which the Geological Survey is organised, but you do not give in full detail the scope of the work that is undertaken by your department?—A. I have some further notes that might go into the middle of my answer to questions 25 and 26 where I say, "The lines on which the Geological Survey works are well known, and it is not necessary for me to define them in detail." I can give a brief outline of the general scheme of the department. The scope of the department is clearly defined and the work organised in such a manner that there shall be no overlapping with that of other scientific departments. At the same time the department is so constituted that it is in a position to deal with geology in all its branches. This is only possible by means of organisation whereby officers are encouraged to specialize in certain directions, the result being a body of men capable of dealing in the aggregate with problems in all branches of geology, whether pure or applied, including in that category stratigraphy, palæontology, petrology, mineral chemistry and mineralogy in all its aspects whether systematic, economic or statistical. Another important branch of activity of the Geological Survey is that connected with education. For many years past officers of the department have been engaged in teaching geology in the Presidency College at Calcutta, in the Calcutta University, in Poona and in Madras. This arrangement is advantageous to officers who may have specialized in particular directions for they are still kept in touch with advances in other branches of geology and are thus enabled to keep their general knowledge completely up-to-date. The advantages gained by the educational establishments are equally great or greater, since they could not obtain elsewhere lecturers with such an intimate knowledge of Indian geology. In addition to theoretical instruction, the department also assists in the practical training of students, and places its library.

laboratory and museum at the disposal of those seriously engaged in geological research; research scholars are received in the laboratory and are guided and assisted in their work by members of the department. There are also a number of young men employed in the museum and laboratory as museum assistants, field collectors, etc., who can either continue in Government service or have opportunities from time to time of leaving us and taking up more lucrative private work. The latter system would, I think, be capable of development on the lines of apprenticeship, although such a system could not be expected to be successful until the general ideas prevailing in this country in regard to it have undergone some modification.

Q. What do you mean by that last sentence, "until the general ideas prevailing in this country in regard to it have undergone some modification"?—A. I get enquiries from young men who write and say that they wish to learn geology and would like to come and join my department, and then ask me if I would guarantee them appointments. It is not quite my idea of apprenticeship.

Q. You must always get a large number of young men in every country who are ignorant of how these things are done. That does not discourage you from continuing the system of apprenticeship and it will enable you to pick up the right kind of men and train them?—A. We have apprentices, not necessarily in geology, but they are not entirely satisfactory. They do not regard it as their duty to attend office every day; still some are certainly doing good work.

Q. Your note refers to the possible conditions abroad. I do not know if you have ever considered or heard the suggestion that I made in 1906 to the Imperial Institute Committee, that there should be in London a trade representative from India and there should be attached to him one geological officer and at least two officers connected with agriculture, forestry or other departments dealing with vegetable products. The idea was that these officers should be at home for about two or three years; they should be senior enough to know India and Indian conditions but junior enough to bring back with them when they returned to India a certain number of ideas picked up when attached to the trade representative in London. Their business would be to advise the trade representative regarding mineral questions, to distribute information to those who are interested in mineral development as to the kind of minerals that ought to be investigated and the lines on which research work should be carried on. Have you had an opportunity of considering a scheme of that kind?—A. No. The matter has not been brought before me in any way, but I remember your outlines of it and I remember a certain amount of correspondence about it. I consider that it would be an excellent scheme. I think it will be extremely valuable not only in the interests of mineral industries, but also in those of the departments concerned.

Q. I understand that you have still the system of study leave. Is that system taken advantage of?—A. Yes.

Q. And you find it of real use to the department?—A. Yes. I find it quite satisfactory.

Q. Will you turn to your answer to question 21. In referring to your correspondence with the Imperial Institute you say "The results of these references have not been satisfactory, partly owing to the long delay before replies were received, and partly to the fact that the information supplied has not always been correct. This latter is a serious drawback because it destroys confidence in all information communicated." Can you give us any examples of any report from the Imperial Institute that you have found to be unsatisfactory in this respect?—A. As a concrete case I may mention that six specimens of laterite (bauxite) were sent to the Imperial Institute in January 1905 for analysis and report. No reply was received for nearly two years (January 1907). The report then furnished contained what purported to be, in essential points, a description of Bayer's process for the extraction of alumina from bauxite; but was incorrect in regard to the essential feature of that process. Had the information at the disposal of the Director of the Geological Survey not been more accurate than that of the Director of the Imperial Institute, we should have published an erroneous statement which might have been seriously misleading. The mistake led to a further delay of eight months before the results could be published, since it was necessary to refer the report back to its author for revision. In most other cases the delay was equally great, ranging from a little over a year to four years. Another cause of complaint was the failure of the Director of the Imperial Institute to quote authorities for "expert" opinions obtained on our behalf.

Q. Have you seen the lecture delivered by Professor Dunstan before the Society of Arts and which is reproduced in the Bulletin of the Imperial Institute for April-June 1916? In it he states that in 1905 he suggested that a special search should be made in India for thorium minerals, but that the Government of India did not consider this necessary, as the Geological Survey was alive to the importance of the subject. The Director of the Institute further states that there the matter rested until about 1909, when a German prospector discovered monazite in Travancor, and that the deposits were afterwards worked by a company under German control and in German interests. This incident was quoted among others by Professor Dunstan to show that the Imperial Institute "should be a valuable auxiliary to the operations of the Geological Survey of India." Can you tell us if the possible occurrence of monazite in India had been recognised by the Geological Survey before this suggestion was received from the Director of the Imperial Institute, and what steps were taken to prevent the matter being overlooked?—A. The possibility of the occurrence of monazite and other minerals of the rare earths was certainly recognised by the Geological Survey before 1905

and had often been discussed by the officers among themselves. The matter was referred to in print in the Review of Mineral Production for the years 1898-1903 published in the *Records* in January 1905. In addition to this, officers were warned to keep a careful look-out for such minerals, especially monazite, in the course of their field work.

Mr. C. E. Low.—*Q.* Were specimens sent to the Nagpur Exhibition of 1908-09 and was the attention of prospectors drawn to the mineral?—*A.* Yes.

The officers were warned to look out for monazite from 1903 onwards?—*A.* Yes.

President.—*Q.* That statement of Professor Dunstan's was apparently misunderstood by certain newspapers who imagined that there was a certain amount of apathy on the part of the Geological Survey of India. What I want to know is this, was this suggestion, when made by the Director of the Imperial Institute, answered in any way that would give him to suppose that his suggestion would be neglected?—*A.* Certainly not. The papers in my office show that his suggestion was dealt with not only in a despatch by the Government of India, but also in a letter written to him direct by you and dated May 15th, 1905. The Government of India asked the Secretary of State to thank him for his suggestion, while you wrote to him at considerable length, pointing out that the Geological Survey had had the matter in mind for several years, and you explained fully the grounds on which it was clearly inadvisable to divert officers from more important work to this investigation. You also expressed your pleasure on hearing that he was prepared to take up the determination of rare minerals, and offered to send materials to the Imperial Institute from time to time.

Q. As the monazite occurs in the Travancore State, it is beyond the ordinary range of the Geological Survey of India. But did any officer of the Geological Survey enter Travancore between 1905, when the suggestion was made, and 1909, when the monazite discovery was made?—*A.* No officer visited Travancore during that period.

Q. The following statement was published in a London paper, the *Indiaman*, of the 8th September 1916. "There can be no doubt that if the Geological Survey of India had recognised that the Travancore sand was rich in monazite, and if the deposits had been properly brought to the notice of the various British firms interested, the Indian monazite supplies would not have fallen into German hands." This statement not only challenges the system of administration in your department, but reflects on the personal efficiency of the officer who acted as Director after my departure from India and before you took over charge. It is important therefore to know:—(1) whether, on learning of the discovery of monazite in Travancore, any steps were taken to verify it, (2) whether the attention of Government was drawn to the importance of the discovery, and (3) whether and what steps were taken to inform the public?—*A.* (1) Messrs. Pearson and Schomburg, who were both prospecting in South India, were in close touch with the Geological Survey, and frequently sent specimens for determination. As soon as monazite was discovered in Travancore, we asked them for specimens, which were forwarded to us with full information. (2) Immediately on hearing of the discovery, the officiating Director of the Geological Survey drew the attention of Government to it and to its probable importance, and suggested that the Travancore Durbar should be asked to permit an officer of the Geological Survey to visit the deposits. (3) Attention was drawn to the discovery in the next issue of the *Records* which happened to be the Quinquennial Review of Mineral Production for the years 1904-1908—a publication which has a wider circulation than any other issued by the Geological Survey. In addition to that specimens were sent to the Nagpur Exhibition to draw the attention of prospectors to the discovery of monazite.

Q. Do you remember the date of the unofficial note sent to the Government of India by Mr. LaTouche in 1909 after the discovery of monazite?—*A.* I think it was 10th October 1909, but I am not quite sure.

Q. And the date when the Quinquennial Review of Mineral Production was published?—*A.* That came out in May 1910. That was the next issue of the publication.

Q. What was the nationality of the company that was granted a lease to work monazite sands in Travancore?—*A.* British; The London Cosmopolitan Mining Company, which was registered in England on the 5th December 1907. It had been in existence for two years before then as a British company.

Q. Have you any official knowledge as to what steps were taken to verify the nationality of this company in addition to the fact that it was registered in London on the 5th December 1907?—*A.* No.

Q. Did this pioneer company obtain a monopoly of the known monazite deposits in Travancore?—*A.* No. A company is, at the present moment, I believe, working or preparing to work areas which were not taken up by the original company.

Q. Can you give any idea as to how the monazite came to be sold to Germany and how the company came virtually under the control of Germans? In other words, what was the real origin of what the writer in the *Indiaman* describes as "the scandal of the German capture of Travancore monazite," which he attributes to the negligence of the Geological Survey?—*A.* According to a letter in "Journal of Gas Lighting" of September 1st, 1914, from the Secretary of the Travancore Minerals Company, that company had made a contract for the whole of its output "with the only firm in Europe" capable of taking such an output. It was further stated that up to the outbreak of war only one application had reached the company from England, for supplies of monazite and that the applicant was supplied with all

the sand that was asked for. According to the *Times* of October 14th, 1916, although the Government of India had made a special reservation that none but a British company should hold the concession, enquiries subsequently proved that the company was British only in name although it was registered in England, and that all the preference shares and a large number of the ordinary shares were held in trust for the Deutsche Gasluhlicht Gesellschaft of Berlin, the nominal holders being an English company.

Q. That is a matter beyond the ken and control of the Geological Survey?—A. It is quite beyond my province. I only found it out from the published prints.

Q. The author of the articles in the *Indiaman* quotes, in support of his condemnation of the Geological Survey, the statement referred to before as published by the Director of the Imperial Institute, Professor Dunstan, whom he refers to as one "whose authority Sir Thomas Holland will not question." It had not occurred to me before to regard him as an authority on Indian geology, and perhaps you can help to clear up this matter. I understand that Professor Dunstan did once pay a short visit to India somewhere about 1913, and in view of his statement that the Imperial Institute should be a valuable auxiliary to the operations of the Geological Survey of India, I should like to know whether Professor Dunstan communicated with you during his stay in India?—A. He did not. I believe that Professor Dunstan paid a visit to India a few years ago, but I am afraid I cannot give you the exact date. I have heard it was early in 1913, but as he neither wrote to me nor visited me, I am not in a position to give any definite information on the subject.

Q. Were your personal relations cordial?—A. I had never met him. Our official relations were perfectly friendly.

Q. If the Imperial Institute is subsidised to co-operate with the Geological Survey, did Professor Dunstan inform you that he had deputed two young men to undertake a geological survey of Gwalior State, and did either of these men consult you as to their work or their results? I am asking you this question, because I discovered that the matter had been concealed from me while I was the only representative of India on the Advisory Committee of the Imperial Institute?—A. I received no information on the subject. In fact, I only heard of their presence in India accidentally through a member of one of my field parties which was working in Central India.

Q. I want to refer to another subject now. The neglect to investigate the Khewra potash deposits is referred to in an article published in the *Indiaman* of the 19th May 1916 as "one other example of the Indian Geological Survey's neglect of the commercial and industrial side of its work." It is stated that, while these deposits were known in 1873, it was only when war broke out in 1914 that the survey, after forty years' neglect of the subject, began to investigate the Khewra deposits. The writer asserts that "this is not a creditable state of things in a country like India, whose chief industry is agriculture, for which potash is a vital necessity." The remark about the value of potash to Indian agriculture we know, from other reliable witnesses, to be due to ignorance of Indian conditions; but is it true, in any case, that the Geological Survey neglected to investigate the Khewra potash deposits?—A. Certainly not. So far from neglecting the deposits, the Geological Survey has had the matter in mind continuously since 1903. Before that, information was published in the *Manual of the Geology of India* both in part 3 (1881) and in part 4 (1887). In 1904 the matter was taken up again in collaboration with the Commissioner, Northern India Salt Revenue, and, as you say in your letter of August 11th to the *Indiaman*, the deposits were inspected and samples and analyses were sent to chemical manufacturers both in India and in England. The opinions received from commercial sources in the latter country indicated the poverty of the deposits, but did not justify their total condemnation. The work was therefore continued, and an officer of the Geological Survey was again sent to the salt range in January 1912, and an abstract of the results of his investigations was published in the *Records* issued in May 1913, while a more complete paper was published also in the *Records* in December 1914. The investigation is still continuing although the work carried out so far justifies the statement made in your letter of August 11th to the *Indiaman* that the known deposits would be "relatively too small poor and irregular to be commercially worth working so long as cheaper German supplies were available". The investigation is not yet complete, and I should like to point out that the deposits that have to be examined extend over a distance of something like 200 miles; some considerable time is required therefore for their complete investigation and it is possible that we may find better material later on. But the remark made by you in your letter is entirely justified.

Q. You have read the letter that I have sent to the *Indiaman* to correct these statements. Presumably Prof. Dunstan wishes the public still to imagine that "the scandal of the German capture of Travancore monazite" and "the discreditable neglect of the commercial and industrial side of the Khewra potash deposits" are due to the negligence on the part of the Geological Survey. I should like to know whether the statements made in the letter published on the 11th August were correct or not?—A. The statements made by you in your letter of the 11th August, so far as I know, are entirely correct and are borne out by the documents and files in my department.

Q. Coming back to the question of the Imperial Institute, you are probably aware of the fact that at different times I pointed out, as Director of the Geological Survey, that the Imperial Institute might be of value to the Geological Survey of India, as, for instance, in the way described in that letter of May 1905, that you quoted at the beginning. Do you think I was

ever justified in assuming that the Imperial Institute still might be of assistance to the Geological Survey?—*A.* Undoubtedly it might, but I do not think there is much use hoping for any assistance from it with the present personnel.

Q. In the statement published by the Director of the Imperial Institute in his Bulletin for April-June last, he states that the monazite deposits of Travancore were discovered by a German prospector, Schomburg, and that they afterwards came under German control. I understand that Mr. Schomburg is a naturalised British subject, and is thus at liberty to test the legal value of this misdescription; but can you tell us if Mr. Schomburg gave the officers of the Geological Survey reasonable opportunities of learning the truth about his discovery?—*A.* Yes. Mr. Schomburg sent us specimens and gave us every information and assistance, and when an officer of the Geological Survey was sent to Travancore he helped him in every possible way. Mr. Schomburg was an independent prospector.

Q. You had no reason to suppose that he was in any way duping the Geological Survey?—*A.* No.

Q. As he was working for a British company you had no reason to suppose that the enterprise was not British?—*A.* No.

Q. As the material was in the Travancore State it was beyond the province of the Geological Survey?—*A.* Yes.

Q. You say that one of the subjects that might be taken up more thoroughly is the question of subterranean water-supply. Had you in your mind the idea that the Geological Survey might be enlarged or that some other department might be organised with a view to making a survey of the subterranean water?—*A.* What was in my mind was that possibly a party might be detached from the Geological Survey for that purpose; but that would be difficult with our present staff.

Q. They have also done this in Australia?—*A.* Yes.

Mr. Chatterton.—Q. An officer of the Geological Survey was deputed to Madras for this purpose five years ago?—*A.* Officers are deputed from time to time for specific enquiries but not on a general survey. Mr. Tipper went to Madras some years ago.

Q. It is a matter that requires not only geological investigation but engineering tests?—*A.* Yes.

Mr. C. E. Low.—Q. With reference to your remarks under "Imperial Department," suppose you had a man under the Imperial Chemical Department investigating chemical problems with reference to say, tanning, the result of this work would be matters for which the tanning expert would be immediately responsible, whereas, in the Geological Survey, chemical questions relating to chemical geology are matters for which you are immediately responsible. Presumably your idea is to have the grading and recruitment and promotion of this department under the Imperial Chemical Department under a single head and a certain amount of technical control on the chemical side invested in a single head, but if these men were set to work on special lines of work it would bring them very largely under the control of the person in charge of that expert department? Do you think it is likely to cause any difficulty in working, or do you think it can be arranged?—*A.* I do not see why it should.

Q. There is that difference?—*A.* Undoubtedly.

Q. There is, of course, a certain amount of analogy, but it is not complete. There are, of course, other departments which could be thought of in which the analogy might be more complete?—*A.* I should have thought that the position of a man of that sort lent to work out a specific problem for a department would be more or less similar, in his relation to the Local Government, to that of an officer of the Geological Survey working out a specific problem in one of the provinces.

Q. You would refer in particular to the position of the two officers of your department being directly under the control of the Local Government of Burma?—*A.* I do not think that principle is altogether good.

Q. But to a large extent it is an entirely new departure?—*A.* Yes.

Q. Is it one that you would like to see extended?—*A.* No. The other method of working was introduced before I became Director and was on the whole more satisfactory. Officers, say, in Burma who carried out any investigation that they were asked to do sent reports as to their results to the Local Government direct and sent copies to the Director of the Geological Survey in Calcutta. That was done in order to save time. The Local Government could also refer to the officer in charge of the party direct for advice. I think the position of the two officers of the Geological Survey placed in exceptional circumstances directly under the Local Government is hardly analogous, because that is more a question of urgent investigation which has to be carried out in a hurry and there are certain factors of provincial administration which I should have thought would hardly come in in the case of a chemical officer attached or lent to another department.

Q. Suppose you follow the instance which I gave you just now of a man who investigates chemical questions in connection with tanning, the local provincial department might be administratively concerned with choosing a site for a tannery and organising a company to work it?—*A.* Yes. The chemist would no doubt be expected to carry out the investigation as

put to him by the department for whom he was working, and to some extent he would have to be under that department.

Q. The two officers who were sent still refer to you on technical points?—A. Yes.

Q. Do they report to you regularly?—A. Yes. They report to me and send copies of their reports to the Local Government.

Sir F. H. Stewart.—Q. You recommend the formation of an Imperial Department of Industries. The head of it should be an ordinary Member of the Viceroy's Council?—A. Yes.

Q. Assuming that that it is not considered practicable, do you think that industries could more properly be handed over to any other of the existing memberships?—A. I think the department would require a member to itself.

Q. You are quite clear that it will be good to have a separate department in itself?—A. Undoubtedly I think so.

Q. You recommend the formation of an Imperial Department of Science and Industry?—A. Yes. I am not particular about the title.

Q. With reference to your paragraph about subterranean water-supply, that department would then be expected to take up this question?—A. Yes.

Q. And the work could be undertaken by men who have not got geological knowledge?—A. A part of the work: that is, boring. But on the whole the scheme would necessitate geological knowledge. It would be undertaken by my department or by somebody with geological knowledge.

Hon'ble Sir R. N. Mookerjee.—Q. Do the officers who go and lecture in the universities and colleges get paid for that work?—A. They get a small monthly pay in addition to their pay in the Geological Survey. They get Rs. 200 a month in Calcutta. They receive it with the sanction of the Government of India.

Q. Do you know of any other department of Government having such a system?—A. No.

Q. If the Public Works Department were allowed to lecture similarly in the engineering colleges, would it not be better for the education of the engineering students? In the Calcutta University they have railway men lecturing, that is, engineers of the Bengal Nagpur Railway?—A. I am not able to offer an opinion with regard to the Public Works Department. We have lent men to Madras and they have been definitely transferred to the Madras Education Department for a certain period.

Q. Does it interfere in any way with their ordinary routine work?—A. It is so arranged that an officer who has a considerable amount of collected material to describe is employed as curator of the museum and laboratory for a year or two. He undertakes the educational work in addition to his geological work.

Q. Who, do you consider, would be the head of the department that you say should be created specially to deal into industrial development and research in all their branches?—A. I should say a Member of Council.

Dr. G. Hopkinson.—Q. As regards teaching demands, are demands for a definite period made and then do the officers return to their ordinary status in the Geological Survey?—A. In Madras the demand is made for a definite period of three years after which the officer returns to the Geological Survey. In the case of Calcutta the officer detailed delivers lectures in addition to his ordinary work in Calcutta, and in the case of Poona the officer goes over there for three months during the recess, when he would ordinarily be employed in working out the results of his previous field-season's survey.

Q. The practical work of students is superintended by the officers of the Survey Department?—A. At present the Presidency College in Calcutta has a very good geological laboratory and museum and a demonstrator who also assists.

Q. Is he a demonstrator of the Geological Survey?—A. No. He is an M.A. of the Calcutta University. He is a member of the Provincial Educational Service. Students reading for the M.Sc. degree and those who hold research scholarship come to the laboratory and work there. The Geological Survey library has 30,000 volumes.

Q. It is probably one of the best geological libraries in the world?—A. I should think so.

Q. What is the circulation of the *Memoirs* and *Records*? Is it considerable?—A. We print 850 copies of the *Records* and 580 of the *Memoirs*. A great many of these are sold. There is a considerable number of regular subscribers.

Q. You refer to the study leave which is granted to the officers of the Geological Survey. What are the conditions on which leave is given, I mean, as regards pay and length of time?—A. Officers take leave and go home for various periods (usually for six months or more); they are given an allowance of six shillings a day and they are expected to work at some recognised institutions, generally at one of the universities, and to send in reports of their work to the Secretary of State at the end of the period.

Q. They have no roving commission to learn what they can?—A. They generally go with a definite object, for some specific piece of scientific research; but I should think that probably the Government of India would allow them to tour for special enquiries.

Q. In your paragraph on "technical aid to industries" you mention instances where Government funds were employed in assisting industries. Were those funds specially allocated for that purpose, or were they included in the budget of the Survey?—A. A special grant for boring operations was made to the Geological Survey for a specific purpose.

Q. Was that investigation carried out for any individuals? I do not understand in what sense the work was carried out with a view to assisting existing industries?—A. It was carried out not so much to assist an existing industry as to encourage a potential one. It was recognised that the copper belt was worth investigating, and it was improbable that in the existing conditions anyone in India would be prepared to put up sufficient money to investigate it; it was therefore recommended to the Government of India that they should bore in order to ascertain the value of the copper belt.

Q. In that case no person or company had an established financial interest in the matter?—A. No. There were companies, but not in the areas in which we bored.

Q. You mention under "general" remarks various matters which are ripe for discussion. Take the case of bauxite. Every one knows that bauxite is to be found in India in large quantities and every one knows that there are only a limited number of places in the world where bauxite is available. What is the attitude of the Geological Survey to the question of the commercial utilisation of bauxite? Do you take any steps to stimulate the utilization of bauxite?—A. We do all we can by means of our publications and giving information freely to encourage the creation of this and other new industries.

Q. All the information obtained is recorded and published in the Memoirs and Records?—Yes.

Q. Have you finished there? Have you done all that it comes within your duty to do?—A. I think so. We bring the matter to the notice of the public. In fact, our province is to give information and advice.

Q. You give information to any one who enquires?—A. Yes.

Q. But you do not go to some likely body of men and say; "Here is bauxite; it can be utilised; will you take it up"?—A. One does not do that officially.

Q. Supposing a Department of Imperial Research was formed and extended to commercial matters, I suppose it would be a link between your purely scientific enquiries and actual commercial development? You would hand over these problems which you mention to the Government department and it would be their business to endeavour to promote commercial development in particular provinces?—A. Yes. I should think so. I have not really considered that aspect of it.

Q. Such a department would probably be in closer touch with the financial interests of the country than you could be expected to be?—A. That would be rather beyond my province.

Mr. A. Chatterton.—Q. The professor of geology in Madras is not a member of the Senate of the Madras University?—A. I do not know. He is temporarily transferred to the Educational Department. I do not know whether he is a member of the Senate or not.

Q. May I understand from your remarks under "Imperial Department" and "General official administration and organisation" that you advocate the formation of an Imperial Department of Chemistry and the deputation of officers of that department as professors of chemistry to the various Government colleges in the same way as an officer of your department is professor of geology?—A. That did not occur to me at the time, but probably such an arrangement might be made.

Q. If that was done and an officer of the chemical department were deputed to institutions for a period of three years at a time or some fixed period, how would you secure sufficient control over the teaching of science in the universities? It occurs to me that there may be some difficulty about obtaining continuity of policy in these matters?—A. I should not have thought that the question raised any great difficulty.

President.—Q. Are you a fellow of the Calcutta University?—A. No.

Q. Have you been a fellow of the Calcutta University?—A. Yes.

Q. Do you know how long a fellow is allowed to be a member of the Senate?—A. Five years.

Q. Has any difficulty arisen in this matter?—A. No.

Hon'ble Pandit M. M. Malaviya.—Q. Would you kindly give me a little clearer idea of the purely educational activity of your department? I understand that one of the members of the staff is deputed to lecture at Calcutta, another sometimes at Poona and another at Madras?—A. Yes.

Q. Is any period fixed for these lectures?—A. In the case of Madras it was fixed. In the case of Poona it is not definitely fixed, but generally it has been three years, that being regarded as a suitable period. In the case of Calcutta, it depends very much upon the exigencies of the service, because if a man after working in the field for some years has a good deal of material to work out, he is brought to headquarters and put in charge of the museum and laboratory where he can work out his results, and during that period, while curator, he is generally also lecturer on geology in the Presidency College. It means continuity of teaching for two or three years, and in many cases longer.

Q. You have found this arrangement to work satisfactorily?—A. Yes.

Q. But don't you think that a gentleman who lectures on geology ought to be a University professor and by virtue of his appointment *ex-officio* member of the Senate of the Calcutta University, would that not be an advantage?—A. I think perhaps it would. But of course he can be a member of the Board of Studies, which is the most important.

Q. Is he a member of the Board of Studies?—A. In practice he is not, because the Director of Geological Survey is usually on the Board of Studies and usually on the Senate.

Q. But the Director does not lecture at the university or the college?—A. No.

Q. The professor who does lecture is not on the Board of Studies?—A. Not necessarily.

Q. Who prescribes the course in geology for the Calcutta University examination?—A. It is laid down in the syllabus.

Q. Is the professor who lectures consulted, or is it done by the Director of the Geological Survey?—A. The courses are presumably laid down by the Board of Studies and the Faculty of Science and then submitted by the latter to the Senate. The Board of Studies in geology prescribes the course for geology.

Q. Are the course, in Calcutta, Poona and Madras the same or are they different?—A. In the Calcutta University and Madras the course for the examination, so far as I remember, is very much the same. Poona is on a different footing altogether, because an officer is only lent to Poona to teach a certain amount of elementary geology as required for the engineering course at Poona, and there is no university examination so far as I know.

Q. They do not have geology as one of the subjects for the degree examination in Poona?—A. I do not think so. Students may perhaps join the Bombay University; in the case of that University a member of the Geological Survey, Mr. Daru, who was formerly professor at Madras, is, I believe, on the Board of Studies.

Q. How does the standard prescribed for Geology for the Calcutta University examination compare with the standard in modern British Universities?—A. The standard aimed at is probably similar to that in the British universities, but the actual standard accepted here is undoubtedly considerably lower.

Q. Is a fair number of students attracted to the geological course in Calcutta?—A. I should think between 20 and 30.

Q. Do the greater number of these go up for the M. Sc. degree or are they content with the B. Sc.?—A. Only a few read up to the M. Sc. I should say, in the last few years the average is five a year.

Q. Is the M. Sc. course of the Calcutta university nearly as good as the honours course in the modern British universities, or is it inferior to it?—A. I really cannot tell you, because I am not in close touch with the teaching in the British universities at present. I happen to know, however, that certain students who have gone to England from here and who would probably have taken their M. Sc. after the ordinary two years' or three years' course, as the case may be, have taken honours in English universities after a similar course.

Q. How many officers are there in your department?—A. Twenty sanctioned. We are very short-handed.

Q. Have you got any Indian M. Sc. among these twenty?—A. No. We have an Indian who is not a M. Sc.

Q. How many are Indians among these officers?—A. One. He is not an M. Sc. He was educated in Bombay.

Q. Have you got in your department any Indians who have come back from Europe after studying in the Royal School of Mines?—A. We have an Indian who was in England and also in Canada where he was attached to the Geological Survey for some time. Other posts on the Geological Survey, those of Sub-Assistant, which are not recruited in England, are held by Indians.

Q. In view of the development of geological activities, do you think that some better provision should be made for imparting instruction in geology in this country, or are the present arrangements sufficient?—A. It would be advantageous to have professors of geology at Calcutta and Bombay and Madras, in fact in all the leading universities.

Q. You say, "It would be preferable to give those to a department to be created specially to deal with industrial development and research in all their branches, and I would place under its control not only the scientific departments but also all Government institutions and laboratories in which science is taught or practised, except those engaged in medical research." Do you include the universities in that category?—A. I was thinking of university laboratories at the time.

Q. Do you know of any country where universities and other higher technical and scientific institutions are not placed under the Department of Education?—A. I am afraid I am not conversant with the subject.

Q. So far as you are aware such institutions are not placed under the Department of Education?—A. I have no information.

Q. What is the case in the United Kingdom?—A. Some universities, at least, are independent. I know of several, which, I believe, have nothing to do with the Board of Education.

Q. It would be better in your opinion to give freedom to the universities? A poor Oxford without Government control is better than a rich Oxford with it, as said Lord Curzon?
—A. The object of university education here is more economic than it is at home. The degree is taken rather for its market value than for the sake of pure academic instruction.

Q. Is that so generally?—A. Such is my experience. It is certainly so in the case of the Calcutta University, with which I am acquainted.

Q. Is it not a fact that graduates of the Calcutta University have gone up in more than one subject for the M.A. degree, and pursued their studies much longer after graduating, than perhaps graduates of other universities in India?—A. The only case that has come to my notice has been where the students in the Calcutta University take up law *in addition to* their other subjects, not after the other subjects; and I have heard complaints that students thus fail to give their undivided attention to their subjects.

Q. Putting aside law, are you not aware of instances where after having taken the M.A. degree in one subject, students have taken the same degree in other subjects also?—A. I have met with cases where students have taken research scholarships and worked with us after taking their M.A. degrees, but in such cases they were continuing their geological and mineralogical studies.

Q. So you have found them showing sufficient eagerness to pursue knowledge for the sake of knowledge after they have taken their degrees?—A. I am not prepared to say that it is purely for the sake of knowledge.

Q. Knowledge is not worth having if it has no value. Either the intellectual satisfaction that it gives, or some other value in relation to life?—A. I should be inclined to think that their object in taking up another subject after taking their M. A. degree is the commercial rather than the intellectual value of that instruction.

Q. You recommend a system of scholarships to members of private concerns to encourage them to go out to study foreign methods. In the case of experts, so employed, they would be men who have been established in life, who have taken service and are now doing work, and they would require to brush up their knowledge by a study of foreign methods. But you know that the system of scholarships at present prevailing is meant to enable students of promising abilities to go out to complete their education in foreign countries?—A. I should not wish to press the point about sending private individuals; that might be arranged by their firms or companies, but I do not see why we should not give a certain amount of encouragement and assistance in that direction. With regard to the diversion of State technical scholarships to that purpose, I really had in mind the case of promising young men in industrial works. I would recruit for the scholarships in a different manner from the method of recruitment at present in vogue.

Q. Your object is to secure a better system of recruitment and not to do away with scholarships for promising young men?—A. My object is to employ the scholarships more profitably than they have been employed hitherto.

Q. By helping young men to complete their education abroad and not by helping experts who are engaged in scientific work here to go abroad to brush up their knowledge of up-to-date methods?—A. I look at it rather from a different point of view. I should employ the scholarships to help industries rather than to help individuals. Industries, I should say, should take the first place.

Q. You want a certain number of young men trained to do scientific work relating to industries?—A. Yes.

Q. How would you train them up?—A. As regards scientific research?

Q. Not merely research, but general scientific work relating, for instance, to geology, work of ordinary investigation, and research of a higher kind?—A. That is a matter that ought to be carried out by the scientific departments of educational institutions, and the science laboratories of the universities.

Q. If you take away these scholarships, you do not substitute anything else in their place to enable students who have done some work here to go out and complete their education abroad?—A. I should not wish to prevent students having the advantage of these scholarships, but they should be students—students is perhaps hardly the correct term—they should be men who have shown their capacity for industrial work, selected from industrial concerns and connected with industries, because, after all, the scholarships are *technical* scholarships and they are not merely for purely educational and scientific purposes.

Q. For a country like India, with its vast resources and a vast field for research, you do think that it is the duty of the Government to provide the highest kind of scientific instruction for its youth?—A. Yes.

Q. Either the Government must establish institutions here which should be very well equipped to give that kind of instruction, or if it does not, it is rightly regarded its duty to enable select students to go out to other countries, with the help of State scholarships, to complete their education?—A. Yes.

Q. That being the object with which these scholarships were instituted, you do not propose that the scholarships should be held back from students, but you want the recipients to be

selected with better care?—A. In this particular case of State technical scholarships, I think they ought to be given to definite industries and not merely to men who say they wish to go to Europe merely with a view to taking up, say, theoretical geology.

Q. Do I understand you to say that students who have qualified themselves to take up particular industries should be sent up? For instance, you want to send a man for mining engineering. Would you take up a student who have passed the M. Sc. with mining as one of the subjects and then send him out, or would you take up a non-graduate who had merely worked at the mines, but who had never graduated or obtained any scientific instruction higher than that required for the matriculation?—A. I should prefer to encourage a man who had shown a practical bent of mind.

Q. Do you mean that you would not attach any value to the theoretical knowledge that a student may have acquired, or would you give preference to one who combined practical with theoretical knowledge?—A. I find it rather difficult to answer such a wide question.

Q. The point is simply this. Do you think that the person who should be selected for the scholarship should be one who has acquired a knowledge of the scientific principles underlying the particular department of industry to which he wants to attach himself and who wishes to go to England to complete his education, or do you think that the scholarship should be given to a man, for instance, who might have worked at a works and risen from a lower to a higher stage like foreman or assistant foreman, *i.e.*, that it should be given without any reference to the education that the candidate might or might not have received at a university?—A. He must be in a position to profit by the results of his work if he is sent abroad. I do not for a minute wish to say that no scholarship should be given to university men. I was merely considering the case of the State technical scholarships, which, I think, are given not quite satisfactorily.

Q. Of the British firm which was registered in London to take up the business in Travancore, the nominal holders were British who held it in trust for a German firm?—A. Yes.

Q. Who were the directors?—A. I do not know.

Q. Was Sir Richard Temple one of them?—A. I do not know.

Dr. E. Hopkinson.—Q. You have a chemist attached to your department?—A. Yes. He is a member of our staff.

Q. You want more chemical assistance and you say that if an Imperial Chemical Department is instituted you will be glad to get further chemical assistance from it. Then you go on to say, "The members of the staff, should, wherever employed, remain under the control of the head of their department and should not be transferred to Local Governments." Is that a feasible proposition that you in the Geological Survey should obtain a man from another independent department and that he should not come under your direct control but should remain under the control of the department from which he came?—A. I had not in view so much the loan of members of that Department to the Geological Survey as the aid to research on behalf of the Geological Survey by the chemists of that department.

Q. What will be the relation of these officers during the time they are with you, to your department and to the Imperial Chemical Department?—A. I have not thought this out. It might be advisable to put them under the Director of the Geological Survey while they are working in the laboratory, if they were expected to do miscellaneous work after they had completed the specific problem for which they were originally lent; but this is quite another matter.

President.—Q. Do you consider this practicable? A certain number of the members of this hypothetical chemical department might have their services transferred for a period of five years say, to the Geological Survey, and thereby come under the control of the Geological Survey for the time being, and they might be renewed in each case at the expiry of that period or transferred back to the chemical department. Do you think that is practicable?—A. That would be quite practicable.

Q. It would be possible and you think it would be practicable to transfer an officer of the chemical department for service under the Director of the Geological Survey?—A. It would be quite a feasible arrangement.

Q. What would you suggest about the pay of such an officer during the time of employment in the Geological Survey Department?—A. There is, I think, a definite rule of the Government of India; he gets either deputation allowance or gets the pay of his grade in the chemical department.

Q. The officers of your department have from time to time been examiners in the Universities of Calcutta, Madras and Bombay?—A. Yes.

Q. And this is not confined to officers who are, for the time being, lecturers in the university colleges?—A. No.

Q. Many officers have opportunities of knowing the university curriculum in this way?—A. Yes.

Q. In addition to those who are actually lecturers?—A. Yes.

Q. And that facilitates the work of transferring an officer for lectureship?—A. Yes.

Hon'ble Pandit M. M. Malaviya.—Q. How long has the Department of Geological Survey been in existence?—A. For about 60 years.

Q. Has the department kept it as an object before it that it should train Indians to qualify them for employment in the higher grades of the department?—*A.* It is open to the research scholars that we train to apply for appointments in the department, and in practice they not infrequently apply for posts in the ordinary way.

Q. My point is has the department kept it before it as one of its objects that it should train Indians to qualify them for higher appointments in the department?—*A.* We have been for many years training men in the subordinate ranks of the department, but they do not necessarily qualify for appointments in the higher grade. It is always open to them to apply for an appointment in that grade. We train them to the best of our ability with a view to making them good geologists, not with the specific object of appointing them to the Geological Survey.

Mr. C. E. Low.—*Q.* You have these research scholars. Is it not one of the objects of research scholarships, that the scholars, if possible, should qualify themselves for recruitment to the department?—*A.* That is one of the objects of the efforts we have made in educating them in geology in the Presidency College and the Calcutta University. I think geological education was initiated in Calcutta by the Geological Survey. We have had more Indians in the subordinate branch of the service.

Sir D. J. Tata.—*Q.* You are, of course, fully acquainted with the mining and prospecting rules. Don't you think that the time has come for some modifications in the rules?—*A.* My attention has not been drawn to the necessity for further modifications.

Q. The point is that these rules were framed in the first instance when the mineral industries of this country were not fully developed. Prospecting licenses were given to all sorts of people who really had no intention of developing the mineral resources of the country, but were selling them to outsiders. But now that a greater desire has arisen to work the mineral deposits of the country and to work them into finished articles, don't you think that there should be some modification of the rules for prospecting and mining leases so as to enable the *bond fide* workers who want to develop the minerals into finished products to do so?—*A.* I think you will find this entirely provided for in the mining rules. I think it is a question of the administration of the mining rules rather than of the actual rules themselves.

Q. The other thing is the area taken up. Formerly the area was very limited. The time has come when this limit should be removed as regards mining leases?—*A.* I consider that the present limit of ten square miles is generous. When the mining rules were revised in 1913, this point was considered and ten square miles was considered to be ample.

Mr. C. E. Low.—*Q.* Has not the independent prospector done very valuable work and is it not generally recognised that he should be in a position to get something for his discovery?—*A.* Certainly.

Q. A great deal of existing mineral workings owe their discovery to the independent prospector?—*A.* Yes.

Q. He entails great risk and works for a long time and he will have to be encouraged?—*A.* I think it is right to encourage him.

President.—*Q.* There is a scheme put before us that scholarships might be granted in England to men of the senior class, that is, assistant lecturers or demonstrators, or men who have done a certain amount of post graduate study, and it is proposed that they might be sent out to India and given scholarships partly at the expense of the Home Government and partly at the expense of the Indian Government, the share being a smaller one to the Indian Government. If a system of that kind were adopted and scholars were brought for two years at a time do you think there would be sufficient work for men of the kind in the way of geological research?—*A.* Yes.

Q. Have you a sufficient number of problems that you could hand over at once?—*A.* I have a great many.

Q. And that, you think, might facilitate recruitment to the department, that is to say, these men having come to India it is likely and probable they would be more willing to accept service than they would be if they were not in India?—*A.* It would enable me also to judge whether they were suitable for Indian conditions.

Hon'ble Pandit M. M. Malaviya.—*Q.* The department having been in existence for sixty years, is it not time that you should train a certain number of Indians to take up this kind of research rather than import young men from English Universities to take up this work?—*A.* We do our best to assist in geological education in India.

Q. The whole question is after 60 years of existence are you doing enough to train Indians for the highest kind of geological education so that it might not be necessary to import Englishmen to take up this kind of research work here?—*A.* That raises a very much larger and wider issue. There are great many reasons why we have not been more successful. It is not for want of effort on our part. Proposals were put forward from time to time, first of all during the time of Mr. Oldham, and subsequently by Sir Thomas Holland, who was responsible for the appointment of the present sub-assistants; and I have also given the matter much consideration.

Q. Take for instance the case of Japan. It did begin with inviting European and American professors to do their pioneering work both in education and industries, but it has trained up a large number of Japanese young men who are now working in the various

departments. What I mean to say is this, that with so well organised a department as the Geological Survey it should be quite possible to train up a sufficient number of Indian young men—graduates—who would take up the most responsible work?—A. I should be very glad to see them in the department if they were suitable; we do all we can in this respect and I can safely say that we have always had that end in view, particularly during the last fifteen years.

WITNESS No. 133.

Mr. J. N. Gupta.

MR. J. N. GUPTA, I.C.S., *Magistrate and Collector of Rangpur.*

WRITTEN EVIDENCE.

My views on most of the subjects referred to in the questions have been embodied in Part II of my "Survey of the Industries and Resources of Eastern Bengal and Assam, 1907-08". Most of these questions have also been recently reviewed in Chapter X, Part V of the Report of the District Administration Committee, 1913-14. With the conclusions reached by the Commission I am in general agreement and as I have no practical experience of either the management or the working of any industrial concerns, I do not think any useful purpose will be served by my writing out in detail answers to the questions framed by your Commission. Regarding the important question of the best form of assistance which Government might render to industrial enterprise in Bengal and the form of administrative organization which will be necessary to give effect to the decision of Government in this matter, I have discussed at some length in a note which I wrote recently and a copy of which I now enclose for the information of the Commission. I wish again to explain as I have already stated in my note that it was written with the special object of concentrating attention on those aspects of the question which seem to bear most directly on the aspirations of the people of a mofussil district in Bengal. I am clearly of opinion that a co-operation between Government and the people on the lines indicated in the note is likely to prove of the greatest practical benefit under the present conditions obtaining in Bengal. Under this scheme we shall be able not only to attract all such local capital as might be available but also to group all skilled labour of the locality which might be suitable for any particular industry. The scheme will also provide the most powerful practical education of the people in industrial undertakings; for people always take a keener interest in a business in which their own money is at stake, and the result of the infusion of Indian capital into such joint concerns will serve the purpose of exciting in the people not only a keen personal interest in the operations of the company, but probably an inducement to training their sons for their future management.

With regard to the enquiry committed to the Industrial Commission I have the following suggestions to offer:—

I. That for the industries which the Commission might consider desirable to recommend to Government to be undertaken for purposes of demonstration as pioneer industries, the people of the locality where the industry is to be started should be permitted to subscribe the capital.

In the Resolution of the Government of India indicating the scope of the enquiries to be made by the Commission, their recommendation with regard to such pioneer industries has been expressly invited. From this Resolution it would also appear that Government would even be prepared to render direct or indirect financial assistance to industrial enterprises, should the Commission recommend such assistance to be given. If Government be prepared to go so far and be willing to undertake pioneer industries it may be assumed that Government will see no objection to encouraging joint stock enterprise to finance such industries. In spite of all that has been said about the unwillingness of Indians, especially in Bengal, to invest capital in industrial concerns, it is my firm conviction that if Government permit people of the locality where a particular industry is undertaken by Government to subscribe the capital, there will be no lack of funds. In Bengal it may be true that the larger capitalists prefer investments in land and usury to industrial undertakings, and that the middle class bhadralogs have not very much capital to invest, but it is also true that if there is a reasonable prospect of financial success, there will be sufficient capital forthcoming even in Bengal. The shyness of Bengali capital to flow into industrial channels is due to causes which will to a great extent be negated if Government undertake to run the industries till their financial stability is assured. I think I am not taking too sanguine a view when I anticipate that far from being any lack of capital Government may have to discriminate between capital which they will refuse and capital which they will accept.

In recommending joint stock enterprise to be developed simultaneously with the pioneering of selected industries I am aware that my views are not in line with the opinions of those who hold that at the present stage of industrial enterprise in Bengal successful individual undertakings must precede joint stock concerns, and that small industries and perhaps home industries are equally if not more important than large industrial undertakings requiring capital which can best be raised by joint stock combinations. These views are sound enough in their own way, and both individual enterprise and home industries have their legitimate functions in the industrial advancement of the country, but if we cast our

eye to the industrial world outside India and comprehend the full significance of the part played by joint stock in revolutionizing the industrial conditions of the modern world, we cannot possibly believe that India will be able to hold her own in the industrial competition of the world without the help of joint stock enterprise. I think the education of the Indian in the value of joint stock enterprise must form one of the most cardinal recommendations in any scheme for the industrial regeneration of the country.

I think the following arguments may be urged in favour of the adoption of the suggestion outlined above:—

(1) The education of the people in joint stock enterprise and the growth of confidence in collective action will form a most powerful stimulus in the industrial advancement of the country.

During the time the industry will be under Government control, the education of the shareholders of the concern will perhaps be indirect only, but this period of probation will be followed by the time when the entire responsibility of management will devolve upon them.

(2) The undesirability of Government competing with private enterprise has always been set forth as the chief objection to Government pioneering any industry. The Secretary of State has very often given prominence to this view. But if the capital is found not by Government but by private parties and Government undertakes only to be responsible for the expert and financial management of the business till it becomes a financial success, a great deal of the objection to Government's direct participation in industrial enterprise will disappear.

(3) Government will not, therefore, be necessarily confined to taking up such industries only as would come strictly within the category of pioneer industries.

No doubt it will be difficult to define what a "pioneer industry" is, for an industry which may be new to Bengal may be already a tried success in Madras, and in one sense no industry will really be a new experiment, for although new to India it is probably already a flourishing industry in more than one foreign country outside India. But perhaps Government would be justified in taking up an industry which is not likely to compete with another existing industry of a similar kind run by private enterprise, at a place so close to the new industry as to make it likely for the latter industry to encroach upon the existing sphere of influence of the older industry.

(4) If either the whole or a portion of the capital is found by the people of the country, it will be possible for Government to undertake many more industries than would be the case if Government have to find the entire capital for each business it takes up.

(5) There would be no difficulty in finding a successor to Government to whom the industry would be made over after it is proved to be a financial success.

All the above advantages appear to be important and therefore although this suggestion has not hitherto found a place in the recommendations made either by the Provincial Governments or pressed in the Councils by non-official members yet I venture to submit it for the consideration of the Commission.

Of course one can easily foresee many difficulties. In the first place we will have to decide about the class of persons who will be entitled to subscribe to the joint stock enterprise provided the offer of capital exceeds our requirements.

A second consideration will be whether Government will be justified in taking private money before it is assured that the particular enterprise would be a financial success. And in case of failure will not Government be running the risk of serious unpopularity? As a corollary to the above it might be asked whether it is likely that the people will subscribe money for an enterprise whose financial success is not a proved certainty.

Lastly the legal position of Government and the shareholders and their respective liabilities will have to be carefully adjusted before the parties could undertake any joint enterprise.

The above difficulties, however, do not appear to be by any means insuperable and a careful and patient examination of the situation may very likely reveal the details of the arrangements which might solve these difficulties.

As regards the first point one may perhaps venture the opinion at once that the people of the locality where the enterprise is started should have the first preference to subscribe the capital for it.

As regards the second group of our apprehensions it might be explained that Government is not likely to embark on any enterprise without adequate previous investigation. And as machinery, expert management, and adequacy of capital are likely to be well provided for under Government supervision there are no reasons for anticipating failure. As regards the uncertainty which must attach to all industrial enterprise it is assumed that the shareholders will be prepared to take the risk. Another further precaution might be that in undertakings of which the final success might be at all doubtful no private money will be taken, and in all cases the exact position in, and the nature of, the risk taken should be clearly explained to all intending shareholders. Such precautions are not likely to make any difference to the flow of capital or to shake the confidence of the people if they know that Government mean to do their best and the business will be carried on under Government supervision and control.

As regards the respective legal liabilities of Government and the shareholders the matter will require careful handling and patient examination of details. Amongst other points it will have to be considered whether Government should guarantee a certain rate of dividend and undertake to recoup a certain percentage of possible financial loss and in return claim a certain share of the profit in addition to the cost of management, etc.

II. That the work of Government in assisting industrial enterprise in the country should not be wholly centralised. The new Department of Industry which it is assumed will be organised for each Provincial Government should not remain a centralised force only, but there should be a Department of Industry in each district and the industrial resources of each district should be examined and developed. Industry should thus form a part of the ordinary programme of district administration like co-operative credit, education, and agriculture, and the District officer should be given a controlling voice in the affairs of this department of the administration also. If the main object of the present movement be the industrial education of the people it will be obviously unwise not to enlist the active co-operation of the District officer in the movement.

If the above view be accepted, the points for determination would be :—

- (1) What should be the relation of the District officer with the Department of Industry and the Director of Industries?
- (2) What should be the relation of the District officer and the Department of Industry with the public with regard to industrial matters?

To take the second point first it will be readily admitted that the control of Government over industries which are selected for demonstration should be thorough for the time Government is responsible for the success of the business. If it be decided to assist cottage industries through co-operative central banks or private individuals with money grants no such direct control of Government over these industries would perhaps either be desirable or necessary. In theory the attitude of Government officials towards the new movement should be the same as laid down by the Government of India (Resolution of 17th June, 1914) for the co-operation movement. "The movement must in its essence be a popular one and nothing should be done to weaken the feeling among co-operators that it is based upon self-reliance and independence." And if in the case of "pioneer industries" Government should elect to interfere in industrial enterprise and manage these industries through their own officers such interference will be only provisional and it will be with the object of encouraging the people to invest capital in such industries and to ensure the final success of the industries, it being clearly understood that Government control will come to an end the moment these objects have been attained. To ensure the co-operation of the public in the movement, it might be desirable to have an "Advisory Board" for each district for dealing with industrial questions.

As regards the first point the Director of Industries should no doubt be finally responsible for the selection of special industries and have direct control over the experts who might be appointed by Government to run the industries. The chief function of the District officer would thus be to bring the new department in touch with the people and give the people that assurance and confidence in the undertakings of the department which his close association with the movement is likely to inspire.

III. That while from one point of view it would be desirable to have decentralization in the schemes which might be proposed for the industrial development of the country from another standpoint we should aim at co-ordination between the different schemes which might be advocated for the different provinces. While each province will have no doubt its own special needs and requirements as also its special resources and capabilities, yet it is very important that all the schemes should be carefully co-ordinated with each other from an all-India point of view. To illustrate my meaning by a concrete example it may be submitted that on grounds of financial economy alone it would be unnecessary for each province to have separate technological and other technical institutions of a similar kind, but each province should specialize in some particular branch of industrial education. Similarly the want of a sufficient number of experts of the right type may also make it necessary for two or more provinces to combine for the purposes of appointing a suitable Director of Industries. Though theoretically it might be advisable for Bengal, Behar, and Assam to have separate Directors of Industries, yet it might be found of more practical advantage to have one Director of Industries for all the three provinces.

2. That the above suggestions have an important practical bearing on the issues raised at the present moment will be exemplified if we take the case of the Rangpur district for instance. Rangpur amongst mofussil stations took a very prominent part in the attempt to revive industrial enterprise in the country in the earlier days of the Swadeshi movement. A weaving and spinning factory, a tannery, and a tobacco factory were started in Rangpur, but all these ventures shared the fate of the other ill-equipped, ill-managed and insufficiently financed enterprises which then sprang up all over the country. The tannery has completely disappeared and the weaving factory was taken over by the promoters of the present Bengal Lakshmi Mill. The tobacco factory is still lingering on but it has practically ceased to work and the directors are on the look out to sell the concern on favourable terms to any of the other successful companies which have crushed it out of existence. But in spite of these failures, the people of this district are most anxious to take advantage of the present situation to start some

industries in the district which might have a reasonable chance of success. But every one who is interested in the matter in any way is unanimous in holding that we shall be courting disaster again unless provision is made for expert management of the concerns which might be started and for placing the financial responsibility of the schemes in the hands of persons whose integrity would be above suspicion. It has accordingly been suggested that Government should be approached with a view to ascertaining—

- (1) Whether arrangements could be made for deciding after expert enquiry what industries are likely to be successful in this district.
- (2) Whether the services of qualified experts would be available to take charge of such industries as might be selected, at least for a few years to come.
- (3) Whether arrangements could be made for the direction and management of the enterprise by a Board which will have a Government officer as its President or Managing Director.

If Government took the lead in making satisfactory arrangements regarding the above points there is a consensus of opinion that there will be no difficulty at all about the capital for any industries which might be selected to be most suitable for Rangpur. In fact it is confidently anticipated that the schemes are likely to be over subscribed.

As regards the industries which will be suitable for Rangpur, tobacco and sugarcane would obviously seem to offer the most likely scope for successful enterprise. It is true that tobacco has been tried and has failed, but management was defective, the machinery was old fashioned and capital altogether insufficient. Expert enquiry might of course show that there is no scope for another tobacco concern in the presidency as there are already other successful cigarette concerns possessing large capital which have captured the market and whose policy it has been to crush and choke off all new ventures by expenditure, if necessary, of lavish sums of money. But, on the other hand, due weight should be attached to the fact that Rangpur grows more tobacco than any other district in Bengal and Cooch Behar the other tobacco producing area in Bengal adjoins Rangpur and there is no other tobacco factory in East Bengal. If, however, a cigarette factory be considered inadvisable we may consider whether the manufacture of cigars specially of those kinds known as Burma cigars would not be a suitable industry for Rangpur. The soil of Rangpur has been found suited for the production of every variety of tobacco and there cannot be any doubt that the tobacco leaf required for Burma cigars could be locally grown in Rangpur. The demand for Burma cigars is growing every day and perhaps more Burma cigars are now smoked in Bengal than cigars of any other kind. There may be scope for the manufacture of stick tobacco in this district. The manufacture of sugar also would seem to offer a very good opening in a district like Rangpur. I understand that the Assam Government have started a large sugar factory and the results obtained have already been very encouraging. Rangpur already grows a fair amount of sugarcane. The area under this crop is daily increasing and there are large tracts of uncultivated lands in thanas Badargunj, Mithapukur and Pirgunj which are reported to be fit for the cultivation of sugarcane.

In connection with the manufacture of both tobacco and sugarcane it might be mentioned that experiments are being carried on at the Government farms in this district with the special object of introducing better varieties of these crops which will have a heavier yield and of which the produce will be of a superior quality.

Besides sugar and tobacco there are some persons who think that the manufacture of paper might also prove to be a profitable business in Rangpur. Comparatively large supplies of bamboo and grass of various kinds are available in this district and the railway communications are good. A paper factory in Rangpur will be within easy reach of possible markets for paper.

Another feasible scheme would be the starting of an aluminium factory in Rangpur. There is no such factory in Eastern Bengal where the demand for enamelled ware and aluminium ware is enormous and is daily increasing.

Of course the labour factor in connection with all these possible industries is not altogether favourable and the wages of labour in this district are comparatively dearer than in Behar and Western Bengal.

As regards the question of technical management, it is suggested that the expert who is to run the industry should be selected by Government on the sole consideration of capacity for managing the business, without any regard to his nationality or any other personal considerations. But the greatest stress is laid on Government appointing a Board of Directors with an official chairman just as the chairmen of the central co-operative banks are officials. A specially selected and trained deputy collector or an officer of the Financial or Account Department may be made the chairman. The other members of the Board might be selected from the shareholders of the joint stock concern.

3. There is still another particular in which Rangpur would desire local consideration. There is a scheme on foot for the establishment of a University college in this district which will teach the usual arts and science courses prescribed by the University. There is a strong feeling however that as the people are subscribing such a large sum of money amounting to five lakhs of rupees it would be eminently desirable if in addition to general education up to a certain standard arrangements could be made for imparting technical and industrial education on some well defined practical subjects which would help the young men of the

district to make their living in industrial avocations. The technical education might relate preferably to industries which it might be decided to start in Rangpur, and for which there may be scope in Rangpur. Another special reason which makes such a suggestion worth considering is that at Rangpur we have already got a technical school which teaches survey, carpentry and black-smithing and which is maintained jointly by the District Board and Government. It is felt that the amount of good done by this institution is perhaps not commensurate with the amount of money spent on it from public funds, and an expansion of the institution on industrial lines will be a very desirable improvement. The Rangpur public will be prepared to subscribe more money if the existing school were made an annexe of the proposed Rangpur College with an arrangement for some forms of practical industrial education. The Commission may, therefore, consider whether it may not be advisable to have one or two district industrial institutions on the above lines instead of having only centralized technological and industrial institutions at Dacca and at Calcutta.

4. It is hardly necessary to point out that this note deals with only one aspect of the intricate problems which the Industrial Commission have been asked to examine, and the suggestions offered in this note have special reference to the conditions which obtain in the Presidency of Bengal. The manner in which industrial enterprise can be developed and encouraged in Bengal through joint stock combinations under Government patronage and support has alone been dealt with. Even for Bengal such important questions as the encouragement of cottage industries through co-operative central banks and otherwise, the starting of a central State bank for advancing loans to individuals and companies on adequate security have not been touched. Nor have I expressed any opinion on such questions as the extension of railway facilities and the re-adjustment of railway rates, the abolition of excise duties, and the imposition of countervailing duties on import of State subsidised commodities from other countries. Not that I am not aware that the satisfactory settlement of these important questions will have a powerful influence in deciding the fate of any new industry which might be undertaken in any part of India but this note is written with the object of concentrating attention on those aspects of the question which seem to bear most directly on the aspirations of the people of a mofussil district in Bengal.

ORAL EVIDENCE, 12TH DECEMBER 1916.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. You discriminate between capital which the Government will refuse and the capital which they will accept. What do you mean by that?—A. I mean that Government will have to fix a certain standard according to which they will have to decide about the financing of pioneer industries. In cases where a pioneer industry is over-subscribed, Government will have to decide whose money they should accept and whose money they should refuse to have.

Hon'ble Sir R. N. Mookherjee.—Q. It is not the intention of the Government to prevent anybody from coming forward to invest capital. In the case of a joint stock enterprise, why do you say that Government may say who can come in and who should not?—A. The whole point is that Government should encourage joint stock enterprise, and when any pioneering industry is taken up, Government should allow private persons to subscribe the money while they would undertake to manage the business for the persons contributing the money.

Q. Your idea is put in such a way as to give the meaning that Government may prevent anybody from putting in his money?—A. I think there is some misunderstanding. The idea which I put forward here is that instead of Government finding the money for the concerns capital should be found by the people of the locality, and that Government should only undertake the management of the business. What I mean is that Government need not go so far as both to find the capital and also to manage the business. But if people come forward to subscribe Government will only accept the management, allowing the people to subscribe. The two things are quite different.

Q. You mean that private people will form a joint stock company under the patronage of Government?—A. Yes, under the patronage of Government.

Q. Do you think you will get people in Rangpur to do it?—A. Everywhere in Bengal. The great difficulty is want of confidence. I am talking of Bengal only.

Sir F. H. Stewart.—Q. Have you tried to get together an Industrial Committee in Rangpur?—A. No.

Q. Have you got men in the district who would be suitable?—A. I think there are. They are not experts but they take an interest in industrial undertakings.

Q. Your suggestion is that they should meet together under the presidency of the District officer and in turn pass on information to the Provincial Director of Industries?—A. Yes and also to the people of the district. It will deal and keep itself in touch with both sides, on the one hand with the people of the district and on the other with the official organization.

Q. Do you think that labour is likely to present any difficulty in Bengal?—A. There may be difficulties in a certain way. Of course I do not know how exactly cooly wages in Bengal compare with wages in other parts of India but I know the rate is very high in Bengal.

Q. Is there any disinclination to work?—A. There is no such thing. People will work any length of time so long as they get the money. At present most of the labour is Beharee

labour. The agriculturists are very well off and employ hired labour for field work, consequently wages have risen in Bengal compared with the rates prevailing in the adjoining province of Bihar.

Q. As you greatly develop industry will you have to get imported labour or is the local labour sufficient?—A. I think a certain amount of labour will have to be brought from outside. I anticipate that the ranks of the poorer bhadralog classes will also supply workmen for the new industries.

Q. With reference to what you said in reply to Hon'ble Sir R. N. Mookherji don't you think that it would be a good thing if at the time Government declared its intention of pioneering an industry Government made arrangements with business people to take over the business side of it?—A. That could be done only in places where such business men are available and when Government had confidence in the business ability of the persons who might be asked to manage the business. But in such cases also, I would recommend that Government should watch over the management and see that the concern is run on sound lines and that the management is satisfactory.

Q. It would be a rather serious responsibility for Government to undertake?—A. Yes, and it would be for Government to decide what amount of responsibility it should take in such cases. But such a number of concerns which were started and managed by Indians failed in this part of the country that I think it would be a wise thing to begin with Government control.

Q. Who will manage?—A. Government will have to find experts for the technical management of the concerns, but ordinary responsible officers of Government could be deputed to be managing directors.

Q. The management could not be carried on by the ordinary Government officers?—You could not ask the District officers to do the thing?—A. No. Experts will have to be appointed for the purpose.

Mr. C. E. Low.—Q. I understand that your principal point is that in starting a factory for any new industry, the consideration of the comparative readiness of the local men to invest money in local enterprises is important?—A. Yes.

Q. The local capitalist will more readily invest in local enterprises?—A. That is not the only point of view from which I have considered this matter.

Q. With reference to what you say about the manufacture of cigars, are the cigars made by machinery?—A. No, by hand. We have started the manufacture of cigars on a small scale only. The recommendations I have made in this part of my note are merely my suggestions I have no expert knowledge regarding these matters.

Q. You speak of the technical school at Rangpur. Can you say what happens to the pupils of the school?—A. We keep a register to find out what happens to boys. Most of them disappear. One or two have started shops. Some have become teachers. There is only carpentry and smithery taught.

Q. What are the class of people who want to take up smith's work?—A. Some of them are the sons of carpenters and smiths and some are poor men who have no other work.

Q. What becomes of the men of the artisan classes who come to the school?—A. Some start shops. One person in Bogra is doing very well. The majority disappear and it is not known what happens to them.

Q. Are they of the artisan type?—A. There are very few bhadralogs as the term is generally understood. Most of them follow the trade as a hereditary profession.

Q. Is it the object of the fathers when they send their sons to the school that they should become teachers?—A. Any how that is what most of them have to fall back upon. They must have some capital to start their own shops. They probably do not find the money.

Q. Do they take up positions as teachers?—A. They do. In our district we are starting manual training in most of our schools. That will give occupation to most teachers of this class because there were no such classes before.

Q. The Rangpur district is an average district for Bengal in point of wealth and development?—A. It is average. It is a little above the average in regard to wealth. It has got very important agricultural products. It is more prosperous than some of the East Bengal districts. It has tobacco which is not grown except in Cooch Behar and a few other places.

Hon'ble Pandit M. M. Malaviya.—Q. You say that if the Government will undertake to be responsible for the expert and financial management of a business then people will come forward to subscribe. But suppose that without being responsible for the expert and financial management, the Government merely lent the aid of some officer who would investigate a proposal and express an opinion about it, would that not encourage the public to subscribe?—A. That will to a certain extent, but not to the same extent as it would, if Government started pioneer industries on the lines I have recommended.

Q. That is a large proposition?—A. It is a question whether the Government will be prepared to go so far as that.

Q. Supposing Government guarantees a certain rate of dividend in a particular business, would that not be enough inducement?—A. It may be, but whether it will be wise or not, on that point I am not prepared to express an opinion. I do not think that Government ought.

to guarantee dividend without knowing what is going to happen to any industry, for if a Government guaranteed industry fails, not only will that discredit this form of Government help, but it will probably strengthen the hands of those who are against Government help to industrial undertakings in any form.

Q. If the Government helps, it will help only after making due investigation. If the Government then helps, would it not encourage people?—A. I think it will.

Q. You say that you have a technical school at Rangpur and that the people have subscribed 5 lakhs?—A. That is for a college.

Q. Is not the importance of technical and industrial education sufficiently recognized in Rangpur to induce the people to put all this money in improving the technical school and raising it to an institution of the kind you recommend?—A. I doubt it. People do not put much value on industrial education at present for many reasons. As long as there are no industries in this country, there is not much scope for industrial education. I could not call on the people of the district to raise 5 lakhs for an industrial school of which the future is very indefinite.

Q. Can't the people sit together and discuss the kind of instruction for which there is room?—A. They will do so. At present the technical school does nothing but teach carpentry and smithery of a very elementary kind and it is a misnomer to call it an industrial school.

Q. Suppose you introduce electrical engineering and mechanical engineering?—A. There are engineering colleges in Bengal. There is not much object in starting another. What we want is some kind of industrial education in such subjects as leather tanning, sugar, paper and glass making. Our technical and industrial schools will not be much appreciated or sought after until they are able to impart such practical and theoretical instruction as will qualify the students to start successful business enterprises of their own.

Q. You want the Government to start co-operative central banks for industries on the lines of the banks for agricultural purposes for small industries?—A. Yes.

Q. You also want the Government to help cottage industries through these central banks?—A. Yes.

WITNESS No. 134.

Mr. F. Miller. MR. F. MILLER, *Mining Engineer and Agent, Villiers Colliery Company, Limited, Jainty Colliery, Karmatar.*

WRITTEN EVIDENCE.

Capital.

Q. 1.—I have had some experience in promoting coal companies, chiefly, however, as a mining adviser. For a reasonably sound proposition I have always found that capital is fairly easily secured in the country.

Government assistance.

Q. 4.—I have had experience of Government financial aid in West Australia where agricultural enterprises are largely and successfully financed on Government loans. Without this assistance the agricultural production would not have achieved half its success, in fact the country has been chiefly built up on loans to the settlers.

Q. 5. (3).—It is self-evident that something requires to be done to stimulate new industries and there must be reasons why enterprise is not forthcoming in a country rich in natural resources and cheap labour. Capital is easily secured in India to float an existing and sound enterprise: it fights shy however of a new industry in a country like this where there are no resident experienced experts to advise or initiate and train raw labour. Under these burdens the alternative seems to be Government aid to tide over the initial stages. I therefore think that a guaranteed dividend for a limited period would induce greater progress in new industries; otherwise privately they will only gradually be evolved.

Q. 5. (4).—Government aid or its equivalent could satisfactorily be loaned wherever the capital security, such as agricultural land and its improvements, would be a substantial mortgage against the loan. This should give an immense fillip to the productive possibilities here where the ryot is too poor to finance the extension of his cultivation to any extent.

(5) India suffers through its crude and consequently expensive methods in subsidiary industries. To overcome this I think Government might originate on a large scale, schemes of practical demonstration, which would rapidly teach and spread the knowledge of the economic adaptability of mechanical means in lieu of the crude ways in vogue.

This should be followed by giving assistance in machinery and plant on the hire purchase system. I have in view the numerous possibilities of reduction in cost for reaping, winnowing, threshing, as well as the mechanical means utilised in other and allied agricultural productions. In industries in India where up-to-date methods are employed the cost of production is lower than the European standard on account of cheapness of labour, whereas in those productions where crude methods still prevail, it can either not or only just compete with other countries through the expense attached to hand labour without the assistance of mechanical means.

Q. 25.—Supplementary surveys of the unworked coal fields would be of advantage to the coal trade. The existing geological reports should be strengthened by a more detailed practical enlargement suitable to modern requirements. Surveys for industrial purposes.

Q. 43.—My experience of the land policy of the Government is chiefly confined to the Sonthal Parganas where the policy is particularly retrogressive and has proved very detrimental to business progress. The law apparently gives all facilities for mining enterprise, but the application of these laws lies with the Government officers who may use their own discretion in their application and thereby cause endless delay. The acquirement of a bigha of land seems to be of profound importance, whilst two years retarding of an industry beneficial to the province is of no consequence. Land policy.

The Government of this province should, from a business point of view, define to its officers what the limitations are on the development of its mineral industries, instead of following, as now, an undecided policy, which kills enterprise.

Q. 97.—As regards coal the facilities offered by the railways are on the whole quite reasonable and progressive particularly with the Bengal Nagpur Railway which has been the gainer thereby. The East Indian Railway is more conservative and in numerous instances has been retrogressive. A railway, in my opinion, should adopt a liberal policy as far as the ultimate good to the country is concerned, though for the time being it may react in particular instances to the detriment of the railway company. Railways.

The short wagon supply to the collieries is proverbial, but I don't think an increase in the wagons would overcome the difficulty. The solution appears to lie in increased facilities to secure an accelerated despatch of wagons.

Q. 110.—It is an understood maxim that coal properties are handicapped owing to uncertain titles, especially in the exploitation of a new coal field. It seems reasonable to expect that Government should assist in a solution of this problem. Many properties are standing idle and future fields are avoided because of this uncertainty. General.

Labour shortage could, I believe, with the co-operation of an industrial Government, be very much overcome to the tremendous gain of the country.

It is noteworthy that the supply of 99 per cent. of the miners, come from within 30 miles of the coal fields and about one-half of these are migratory during the festive and cultivating periods and this probably affects the outturn as much as 30 per cent. Moreover the independence of this labour is intolerable, due to the fact that there is keen competition to secure it. There must be millions of labourers in the country who possess no cultivable lands or continual employment and from whom recruiting is possible.

I believe the dissemination of technical knowledge among the overseers would not be of any great utility to the coal industry. This class of labour requires to be essentially practical, and this result can only be gained by long experience in the mine. The introduction, through the medium of a technological institute, of a scientifically educated overseer, would not compensate for the lack of practical knowledge. To produce the combined practical and theoretical man is, I believe, unworkable at the present stage of Indian education among the working classes. A technological college at Dhanbaid would only serve a useful purpose in training intending managers and under-managers as is done at Sibpur.

The utilization of bye-products is a branch of industry which gives great promise of a successful future not only as a remunerative investment, but as tending to promote and improve other connected industries. Its late introduction is due to the shyness of capital to accommodate itself to a new venture in which India has had no experience. It also points to assisting materially in solving the greater utilization of second class coal.

I see no possible opening for establishing other industries of consequence. In Jharia or Ranigunge coal fields engineering may be advantageously increased.

ORAL EVIDENCE, 12TH DECEMBER 1916.

President.—Q. How long have you been in India?—A. 11 years.

Q. You were engaged practically the whole time as a mining engineer?—A. Yes.

Q. You say that you have some experience of Government financial aid in West Australia where agricultural enterprises are largely and successfully financed by Government loans. Could you give us very shortly any idea of the system by which this is done?—A. First of all there is the agricultural bank which loans money at the rate of 5 per cent. and this money has to be repaid within 30 years. In the first 5 years nothing is paid and then the capital and the interest begin to be paid together. The whole thing is paid off in 30 years. The man takes a certain number of acres from the Government according to the quality of the land suitable for him. He generally has £50 himself and by borrowing a certain sum of money from the agricultural bank he is able to start work. He is only allowed the money on making certain improvements. One is clearing the land, that is, clearing it of trees and preparing it for the plough. Another is a dam to provide against shortage of water; another is fencing, and another is a certain amount of stock for breeding purposes. Then over and above that, there is a tremendous arrangement with firms who give machinery on the hire purchase system. This help is not given by Government.

Q. Do the Government take any security for the loan?—A. They have a mortgage on the property.

Q. You say that you have been away from Australia for some time and you do not know whether many of these mortgages have been taken up or not?—A. It is not so long since I came from there, about three years. Very few are going into liquidation. I read the papers and there are very few such cases to my knowledge.

Mr. C. E. Low.—Q. Did you get a considerable amount of Indian capital or was your capital mostly European?—A. Mostly European capital.

Q. Some Indian capital did come forward?—A. Yes.

Q. Mostly from what class of people?—A. Marwaris.

Q. Not as a rule from Bengalis?—A. No.

Q. You think that Bengalis are now inclined to invest in coal companies?—A. They do as they get into the knowledge of things. When they get more knowledge of mining they realise things better.

Q. And that makes them more apt to invest in coal mines carried on by anybody whether European or Indian?—A. Quite so.

President.—Q. Have you got any supplementary remarks?—A. I think it would be a good thing if we had better conditions for labour. If their housing conditions and their domestic conditions generally were improved I think they would be attracted much more.

Q. Are there not improvements being made in the coal fields?—A. That is very gradual. It has taken 10 years to get, say, 25 per cent. of what we desire.

Q. What steps do you propose in order to accelerate the rate of progress?—A. I do not think it is possible for Government to take any steps.

WITNESS No. 135.

Mr. R. D. Mehta. MR. R. D. MEHTA, C.I.E., of Messrs. D. B. Mehta & Co., Managing Agents, Empress of India Cotton Mills Co., Ltd., Calcutta.

WRITTEN EVIDENCE.

Capital.

Qs. 1-3.—I am the sole partner of Messrs. D. B. Mehta & Co. I have been connected with a number of companies with limited liability, the Empress of India Cotton Mills, Limited, being managed by us. We have never experienced any difficulty in raising the capital required for the concerns with which we have been connected. In each case the share capital was subscribed within a few weeks after publication of the prospectus. We put our own money in the concern, and a good portion of the capital used to be subscribed by friends. If there remained a balance still, we had no difficulty in making it up by advances from our bankers. The condition of Bengal was in those days different from what it is now, and Europeans and businessmen alone thought of investing their money in joint-stock companies. Now the people have come to evince some interest in such investments. But the outstanding feature of the position is that shares in companies floated by respectable parties commanding public confidence would be easily taken up, while other companies would find considerable difficulty in raising the capital. A good deal depends upon the personality of the managing agent or agents. This must always be so. Of late there has been a wholesome expansion in light railways, and it has been due to a large extent to the fact that in most cases a minimum return is guaranteed either by the Secretary of State for India or by the Secretary of State for India and the Provincial Government or by the District Board concerned. A large portion of the share capital has been subscribed by Indian investors. Until, however, a few years ago Europeans figured largely as share-holders of joint-stock companies, Indian capitalists confining their investments to Government promissory notes, municipal debentures and port trust debentures. Of the Indian shareholders the bulk belong to the middle classes. The money subscribed by these people must be their savings.

Industrial enterprise in India has not reached that stage of full development when the contingency mentioned in question No. 3 should be faced as a serious factor. Some mills do work short time at intervals. Before the boom due to the War, the jute mills of Bengal, for instance, had to reduce their production by working only a few days in the week. A short time ago the Bombay cotton mills also wanted to work, and some did work, short time to remove the glut in the stock of finished goods. The oil mills of Calcutta and the suburbs also adopt that method for reducing production with a view to keep up prices. But in each case the circumstances justifying the measure are exceptional and of a more or less temporary nature. In my opinion, the broad proposition that in any industry here more mills have been started than can be maintained in full time employment lacks justification.

Government assistance.

Q. 5.—(1) I would have this sort of help only in exceptional cases; for instance, in cases in which the individual or the company attempts to introduce and popularise a new but promising industry. The principle governing these grants-in-aid should be that the party

seeking the aid is engaged in work which would otherwise have to be undertaken by Government. By way of illustration I would just mention match, dye, glass and wood pulp industries. This list is only illustrative and is by no means exhaustive. There may be other industries equally deserving of support. Each application for support will have to be decided on its merits, but the guiding principle should be, as noted above, that from the importance of the particular industry to the general interests of the people and the country, Government might well undertake it, and that the pecuniary help relieves Government of a duty which, but for the start made by the private party concerned, would have to be undertaken by Government sooner or later.

(2) Bounties and subsidies should be governed by the same principle. The main difference in the case of this sort of help is that it should be for a shorter period than money grants-in-aid. It is quite likely that certain industries, which from their influence upon the general interests of the country have an Imperial importance, cannot be run as profitable concerns for long years. In their case money grants-in-aid would be preferable. There may be other industries again, like the match industry, which would best be developed by starting a large number of small factories in out-of-the-way places—in hills and forests. A system of grants-in-aid would encourage such industries.

(3) The policy of guaranteeing dividends may be adopted with proper safeguards. The system has certainly helped the expansion of light railways or feeder lines.

(4) I thoroughly approve of the idea of granting loans to private concerns. Before now suggestions have been made at least in two cases for advances to such concerns—to the Dacca Bool Bool Soap Company and the Ambala Glass Works. If the system had been in vogue then, both those concerns could have been saved.

(5) I do not approve of the supply of machinery and plant on the hire-purchase system as a general proposition, but such a system would have a marked effect upon Indian agriculture. It is necessary in the case of agriculture which has not much capital to back it up. Concerns with command of capital do not deserve this help. In the case of the sugar industry which is mostly in the hands of petty capitalists, the system is equally necessary. Indian conditions at present make it difficult for the industry to be carried on in large centralised factories. Salt refineries can be developed in the suggested way.

(6) Provision of part of share capital would be necessary in the case of difficult industries which require a large capital for successful working. We want this sort of help also for the development of Indian industries, but the question where it would be more effective than any of the other methods, will always depend upon the circumstances of each case.

(7) The guaranteed Government purchase of products does not appeal to me. It must never be forgotten that Government money is public money, and the greatest caution must be observed in applying it to purposes for which it is not primarily raised. The condition that products must be purchased by Government for a limited period can only be imposed where these products replace foreign imports on Government account or when they are required by Government. Otherwise the products purchased with public money will be wasted for want of scope for utilisation. In this last case the industry could be helped as well with bounties and subsidies or in any of the other ways specified under the head of Government aid to industries. Why then this indirect help? At the same time I would certainly insist upon Government supplying their own wants by purchasing articles made in India in preference to those imported from abroad.

Q. 6.—As a matter of general principle when public money is applied for the support of industries, Government should have some control over those industries. This control need not be of a uniform nature. We should have Government directors in the two cases where dividend is guaranteed and part of the capital is subscribed by Government. No control is necessary where only money is advanced as loan, or machinery and plant are supplied, or the purchase of products is guaranteed. Loans to industrial concerns must be secured debts as in the case of takavi loans, or secured by mortgages of the land, building, etc. Machinery and plant can be supplied either on the hire-purchase system or lent by Government on the applicants finding proper sureties. This condition of sureties may be dispensed with when the supply is through a co-operative credit society. In case of money grants-in-aid, bounties and subsidies, I would insist upon periodical inspection of the concerns by Government officers and audit of the accounts by Government auditors.

Q. 7.—I have no experience of pioneer factories. In India we have not done much in this line. The only experience before the Indian public is that of Madras. The chrome leather industry and the aluminium industry owe their development, according to general report, to State pioneering, but we here are not in possession of details. In Japan the State pioneers industries systematically. On this point too we have not got detailed information. Mr. C. J. Hamilton has been to Japan to study the whole question of the development of Japanese industries, but his observations are not before the public. Without claiming any experience of pioneer factories, I may state it as my general opinion that the State has a duty in the matter in an undeveloped country like India. The people are nervous and capital is shy. The best way to push forward new industries is by demonstrating their possibilities as dividend-earning concerns before the public. In my opinion, pioneer factories will be useful in this country.

Q. 8.—Government should pioneer industries by starting factories which will be worked by them only so long as private capitalists do not come forward to buy them up. Purely pioneer factories cannot be converted into permanent Government enterprises. There may, however, be some factories which Government would like to retain in their own hands permanently for the supply of their own requirements. The Government Harness and Saddlery Factory at Cawnpore, for instance, has served in the days gone by the purposes of a pioneer factory, but is maintained, and rightly, as a permanent Government enterprise.

Financing agencies.

Q. 10.—In my opinion arrangements should be made for the establishment of special banks for the support of industrial concerns. They should have greater latitude as regards advances and investments. From the necessity of the case current accounts cannot be allowed in these banks, and greater restrictions upon withdrawals of fixed deposits are required. The law relating to liquidation too will have to be modified. It must not be open to one or two or even a few shareholders to force the concern to go into liquidation. The existing banks can help industrial concerns by making advances against the stock of materials and the finished products. I have heard it complained that the respectable banks are too strict in the matter of advances, and weak concerns, those that are most in need of it, find difficulty in getting money. Our firm, however, never had this experience. The point requires investigation. But I may take this opportunity to offer one suggestion. The rules relating to current accounts should be revised, and the minimum monthly balance upon which interest is allowed might be reduced with profit to trade and industry. Under the present arrangements the cash in the hands of the middle classes is not employed for the support of trade. This is a loss. The cash in the hands of the individual holders may be and is small, but the total will come up to a good round sum. Efforts should be made to attract this capital to trade and industry through the banks. This can best be done by having a low minimum monthly balance for current accounts. There would be an appreciable increase in loanable capital as a consequence, and perhaps in the bank rate of interest. The rate of interest at times is high. With more liberal rules for current accounts and a larger number of these accounts, the political situation will also improve. There will be fewer inducements for dacoity and burglary.

Limits of Government assistance.

Q. 13.—The principles indicated above will be enough to prevent Government aid competing with existing, or discouraging fresh, private enterprise.

Q. 14.—There should be no limitations on Government aid to a new enterprise if it competes with an established external trade. In view of larger interests to be served all considerations of prejudice to existing interests must be put aside in determining this question of Government aid to industries. Existing industries must be protected and new industries established with Government aid, and if in this scheme of State assistance individual interests suffer, we must boldly face that contingency.

Technical aid.

Q. 17.—The services of Government experts can be lent to private firms or companies on condition of the salaries of such experts during the whole period of deputation being borne by the private firms or companies concerned and all their travelling expenses being paid by them, and on the further condition that the recommendations of the experts shall be communicated to Government with full liberty either to publish them at discretion, or to communicate them privately to such firms or companies as may need them.

Q. 18.—The general principle to be followed in such cases is that the interests of individuals must be subordinated to national interests. Whenever therefore Government are of opinion that the results of researches should be published for public information or communicated to other firms or companies in the interests of the nation, there should be nothing to prevent such course being followed. Care should, however, be taken to minimise as much as possible the attendant loss, if any, to the firms or companies at whose instance the researches have been made. These firms or companies may be entitled to money compensation in some cases, the amount of which shall not exceed the money spent by them over the researches.

Demonstration factories.

Qs. 19 and 20.—There is ample scope for demonstration factories in India. We want them in Bengal too. The form is immaterial, and must vary with local conditions and the necessities of the industry sought to be improved in this way. No general rule can be laid down. In Bengal demonstration factories might with advantage be started for the silk industry and the sugar industry. A factory for the demonstration of the simplest and the cheapest process of decorticating rhea would prove highly beneficial to the whole province. Jute has done for Bengal a great deal; rhea might equally do a lot. The cultivation is not difficult; there is always a brisk demand for the fibre outside India. But the drawback is the rhea fibre cannot be removed so easily as jute. About 25 years ago a company, with some pretensions as to capital and directorate, started rhea cultivation near Tribeni, but the industry failed. Our cultivators are clever enough to learn a simple process of decortication, and once they know how to extract the fibre at a small cost and they know further for certain that there will be no difficulty in selling it, cultivation of rhea will expand rapidly, giving the people of the province a third important crop of incalculable potentialities. Demonstration farms for the improvement of agriculture are equally needed. Under the inspiring guidance of Sir Horace Plunkett Ireland has gained immensely by demonstrations in improved agriculture. There is no reason why the same method should not answer well here.

Research abroad.

Q. 22.—It may be advantageous to have researches made in England for special subjects in which India is interested. This matter of decortication of rhea, for instance, might be investigated in the United Kingdom with greater advantage. French people have been

engaged in this research for sometime past. Similar researches are being made in other countries on the Continent. The investigators in England will have near at hand a mass of information which no man in India can get easily. Besides, they will have a better knowledge of the conditions of the market. The general rule regulating apportionment of subjects for research between the two countries should be that, for subjects in which a certain amount of spadework has already been done in the West and the market for the article is in the West, the research should be undertaken in the United Kingdom rather than in India. Researches also which must be conducted by first-rate experts whose services can be had in India only at a prohibitive cost, must be undertaken in the United Kingdom.

The British Council for Research will best spend its energy in India and help Indian industries by communicating to the Imperial Board for India all important discoveries.

Q. 24.—An Imperial Board for Research is needed for the promotion of Indian industrial interests. I do not know how far the Indian Science Congress serves the purpose. As far as is publicly known nothing practical has so far resulted from the researches of that body. I doubt if any industry has profited by those researches. I want practical help to the industries. The best men should be gathered together for the Board, and the services of colleges and other scientific institutions may be availed of with advantage.

Qs. 25-27.—Further surveys of the resources of the country may or may not be necessary. It is difficult to say anything either way. But the great point is that the official reports have more or less an academic air, and hardly supply the special wants of the practical industrialist. No attempt again is made to popularise them such as they are. Surveys for industrial purposes.

Qs. 28-38.—Commercial museums, sales agencies and exhibitions should prove helpful to Indian industries. The museums and the emporia should be established at all important centres. It would be a great thing if the museums are utilised for the demonstration of improved processes of manufacture. They will have then an important educative value. These and the emporia must be of a more or less permanent nature. Sales agencies are absolutely necessary for the development, not only of unorganised cottage industries, but of some of the mill manufactures. Information about these manufactures is not so general as might be wished and as would influence the sale of the products. Many people, for instance, do not know of the existence even of such articles as Jessore combs, and yet they are manufactured in mills. The museums and the emporia should, in my opinion, work under Provincial Directors of Industries who in their turn must be subordinate to an Imperial Board of Industries. The object must be to disseminate as widely as possible useful knowledge regarding Indian products and to encourage their sale within the country. Commercial museums and sales agencies.

Exhibitions have been held all over the country, both at provincial headquarters and at district headquarters. Their influence upon industries must necessarily be slow and intangible, but this much is plain that they have helped to popularise Indian manufactures. Government will be well advised to encourage exhibitions. I would much rather have them periodically at provincial headquarters or suitable centres within the provinces. District exhibitions might be abandoned. There is at present some waste of energy. We should have one exhibition for each province, and this should be held under the Provincial Director of Industries, the cost being met partly by public subscriptions and partly out of provincial funds. The object should be to bring sellers and buyers into contact. Exhibitions.

In my opinion, the British Consulates should discharge the functions of our trade representatives in foreign countries. That will be an economical arrangement. We should follow the Japanese example. I am informed the Japanese Consulates in different countries are utilised for the purpose of pushing the sale of Japanese goods. Similar efforts of the British Consulates in Indian interest may have to be supplemented at intervals by the appointment of special commissioners for studying the needs of the foreign market and for pushing the sale of Indian products in that market. For market-pushing within the British Empire trade representatives are necessary. Men in touch with trade and industry only should hold that office. For interprovincial commerce trade representatives should not be necessary. All that is necessary to be done in this behalf may well be done by the Provincial Directors of Industries under the guidance of an Imperial Board of Industries. Trade representatives.

I think lists of articles used by Government departments but imported at present from abroad should be published throughout the country, and samples should be exhibited in commercial museums. Both courses are necessary. Government patronage.

The only point I would impress upon the Commission in connection with purchase of stores is that the Government out here must have a free hand in this matter.

Qs. 46-55.—I have some knowledge on the subject of the training of apprentices in factories and workshops. In our mills we had arrangements for such training. We had every reason to be satisfied with the results. But apprentices are not taken in India except in a very few workshops and factories. The East Indian Railway trains apprentices at the Jamalpur workshop in some departments, and the result is satisfactory. The men turned out are well up in the practical part of the business. Facilities are also provided for instruction in the theoretical portion of the work in the night classes maintained within the workshop. Training of labour and supervision.

Apprentices are also taken at Lilooah and Kharagpur and the workshops of Messrs. Burn & Co. In some of the mines also, I am told, arrangements are maintained for the training of managers and overmen. I like the system, and it would certainly be advantageous to the industrial interests of the country if it could be made more general. For want of facilities in India the Indian youth has to be sent abroad for practical training in workshops. Workshop and factory training is different to training in industrial schools. In these latter institutions training can be had only in the small industries like carpentry, tailoring, weaving, book-binding and cane-work, while in factories and workshops the training is for the higher grades of industrial experts. Industrial schools are as much a necessity in India as any other institutions, and I would recommend their establishment all over the country. In Bengal there are only a few industrial schools. The reformatory schools are of course in the hands of the Government. Of the other schools, that at Baniadih is maintained by the East Indian Railway for the sons of its employes and the rest are all managed by missionary societies. Industrial schools should be under the Director of Industries, the Education Department confining its attention to supervision of administration. Technical institutes ought to be established for the training of supervisors and skilled managers, practical training being imparted to them in factories, workshops and collieries under some sort of arrangement with them. Supervisors, managers and technical experts of private firms should be sent abroad to study conditions and methods in other countries. Government should secure them admission into the factories and workshops of foreign countries. The cost should be borne primarily by the firms which employ them and which will benefit by their services, but Government might encourage them by granting scholarships tenable abroad. Private firms will not grudge the charge once the desirability of the deputation is realised by them. The company known as the Calcutta Pottery Works, for instance, has sent the manager twice to foreign countries. Industries assisted by Government may be required to train technical experts on payment by Government of the extra cost and on condition that the firms training them shall have the first claim upon their services on reasonable terms at least for sometime.

Technical engi-
neers.

Q. 54.—I do not think there is so much a want of uniformity in the *standard* of examinations for mechanical engineers held in the various provinces where engineers in charge of prime movers are in certain cases required to be certificated. The standard is practically the same, but the form of the examinations and the questions are not uniform. But it would certainly be desirable to remove all differences such as they are, and any measures designed to remove them should be welcome. Reciprocation among Local Governments and Administrations in the matter of recognition of certificates is desirable. With regard to the law on the subject of qualifications in an engineer in charge of a prime mover, I am myself doubtful about its need. In my experience I have seen first-class hands in managing prime movers, with all the practical training necessary and desirable, lack sufficient general knowledge to pass examinations. They are practically illiterate; at the same time they know their business so well that no mill manager would like to dispense with their services. There is no reason for the step either. Their services are cheaper than those of engineers with higher general and technical qualifications, and it is a question how far this factor of cheapness in the special services can be neglected in the present stage of industrial development in India.

Official organisa-
tion.

Qs. 56-62.—A Director of Industries was to have been appointed for Bengal. In my opinion, every province should have a Director of Industries. He may be helped by a small Provincial Board composed of one official and two or three non-official experts. But this by no means is necessary. The Director who should be a businessman may be left to do everything himself. He must deal with all industrial questions, and in so doing he may consult expert opinion of the province. He should act directly under the executive head of the province as regards matters relating to finance, and under an Imperial Board of Industries as regards all matters of a purely technical nature. He will be in charge of supervision of industrial schools and other technical institutions for the training of skilled supervisors, etc. All applications for pecuniary aid to industries must be dealt with by him, and he will be the authority to decide, with the sanction of the suggested Imperial Board of Industries previously obtained, all questions about the establishment of pioneer factories, demonstration factories and assistance to private firms, and all other questions which directly or indirectly have a bearing upon the provincial industries. If there be a Provincial Board to help the Director, the functions of such Board shall be purely advisory.

I would like to have one Imperial Board of Industries for the whole of India, composed of one or two Government officers and some businessmen—men who have experience in the management of industries. For the present this Board may be placed under the Commerce and Industry Department of the Government of India, but it shall be the supreme head for all questions relating to the development of existing industries and the establishment of new industries. The Provincial Directors shall work under the Board.

Reference libraries.

Q. 79.—Libraries of technical and scientific works at different centres will certainly prove valuable agencies for the dissemination of useful knowledge among the people, and should prove helpful to industry. There is hardly any collection of the kind in Bengal. It may be that the number of readers in the suggested libraries will not be large, but the special knowledge gained by the learned few will in time filter down to the general public.

Colleges of
commerce.

Qs. 80-81.—I should think a college of commerce will be a very desirable thing in Bengal, although I do not entertain high hopes about its influence upon the local industries. At the same time it cannot leave Bengal industry unaffected. In this province literary education has developed marvellously, with the result that the graduates turned out by the Calcutta

University do not find employment. The question of middle class unemployment has assumed a gravity here which it is difficult to exaggerate. Every effort must be made to create a healthy diversion in the course of university education. The best way to solve the problem would be to create among young men a taste for commerce and industry, and a college of commerce is calculated to do this much even if it fails to do everything else. Once this healthy taste is created in Bengal, industries generally are bound to benefit by the change. But to succeed in this direction, the college of commerce must provide facilities for practical training also under some arrangement with some of the respectable firms of Calcutta. In Bombay training in the college of commerce is supplemented by training in the big business houses. The point is the mental equipment of the graduates must be such as to fit them for undertaking some business on their own account as also to supply the brain power necessary for the success of the provincial people in business enterprise. I am well aware that the Government School of Commerce of this city has not been a great success, but the students there lack suitable preliminary general education and the standard of proficiency is not high. A college of commerce, organised on practical lines, ought to give a new direction to the youthful energy and talent of Bengal.

Qs. 82-88.—The statistics at present collected by the Director-General of Commercial Intelligence and the Director of Statistics are undoubtedly valuable, but, as far as I know, are not of much help and use to the practical industrialist. The only statistics which are of practical value are connected with the state of the crops. But even in this matter both the manufacturer and the dealer depend largely upon independent sources of information. Detailed information about the world's stock of materials and manufactures and the condition of the market both here and abroad, issued periodically under the authority of Government, will be far more valuable to the industrialist. It will be a good thing if such information could be disseminated in the country through the vernaculars.

I anticipate excellent results from special journals connected with commerce and industry. The "Indian Trade Journal" has not affected industry in the country. The special journals should be backed by Government, should have a vernacular section, and the rates of subscription must be fixed as low as possible.

The special monographs issued by the Government Departments have more or less an academic value. I am far from suggesting that they should be discontinued. They undoubtedly serve a very useful purpose, but I fear they have not influenced the course of Indian industrialism to any large extent. The aim should be to provide an easy and handy repertory of useful information about a particular industry, and this can perhaps be attained by adding a supplement to each monograph containing a résumé of the whole thing which may be examined at a glance. Easy vernacular translations should also be issued, helping the small industrialist with little or no English education to get a bird's eye view of the whole position. And all Government publications of this nature or containing statistical information must be offered for sale at as low prices as possible. The present level of prices is high.

Q. 96.—I strongly advocate registration of partnerships in the interests of trade. That will go some way to prevent business dishonesty, and facilitate business. Parties will know one another better. Litigation will also be simplified and reduced. In the case of big firms no serious consequences follow from non-registration of partnerships, but the danger is more or less acute in the case of comparatively smaller dealers carrying on business, not in their own names, but in those of others who may be men of no substance. The Marwaris, for instance, usually have a combination of two names for the name of the firm, and the persons whose names are thus used may not individually command either public confidence or respect. There is difficulty in case of litigation as a consequence, and there is some restraint upon dealings.

Q. 102.—Nothing has been done in Bengal towards ascertaining the possibilities of developing hydro-electric power. Investigation should certainly be made in the matter.

Q. 110.—I have been actively concerned in the cotton industry, and the first suggestion I have to make for its development is that the excise duty upon cotton goods made in India must be abolished, independently of the import duty. This latter duty should be maintained at a sufficiently high point, not only for revenue purposes, but for the protection of the Indian industry. In order to attract more capital into this industry, the margin of profits must be maintained at as high a level as possible. It would be wrong to contend that we have reached the utmost limit of expansion. The market for cotton piecegoods is almost unlimited in India, and in the normal condition of things Indian manufactures would supply at least a large proportion of the demand. But, as a matter of fact, the cotton goods produced in India represent but a fraction of the total consumed annually, and the cotton imports, both for value and quantity, form the bulk of our total imports. There cannot therefore be any question of overproduction and glut. If this condition of the market is noticed at times, it must be due to adventitious circumstances. There is ample scope for expansion of the industry, and a heavy duty upon goods imported into India is sure to help development. The War has made this clear. A falling-off in the volume of cotton imports has ensured a ready market for Indian manufactures with an increase in the profits. Anything which goes to reduce the imports will *pro tanto* help the Indian industry. If a heavy import duty, not countervailed by an excise duty, is found impracticable, the Government of India should have ample powers to stop imports as a temporary measure for the relief and benefit of the industry.

Larger production of long staple cotton is another condition of development, and Government are rightly earnest about it, but a more active policy would best meet the requirements of the industry. Concessions, bounties, subsidies,—every one of these artificial means of encouraging production would be justified. Until the supply of long staple cotton becomes abundant, competition with foreign imports must be seriously handicapped.

An Imperial law penalising the mixture of baled cotton with water, and the movement of cotton and coal meant for Indian cotton mills over Indian railways at specially easy rates, or what are known as concession rates, should have a very beneficial effect upon the industry.

Prizes for fine spun yarn appear to me to be well suited to the needs of the industry as a whole. In spite of the growth in the mill industry, the handloom industry holds its ground. If Bengal could regain its lost art of spinning the finest yarn the world has ever seen, this handloom industry would stand upon an independent footing in the matter of supply, and receive an encouragement the importance of which must be obvious. To my mind, the best way to encourage fine spinning in India will be by initiating a system of prizes and in some cases of scholarships.

The cotton industry would benefit greatly by the cheap production of dyes in India. Indigo and coal tar are to be had in abundance here, and there should not be any serious difficulty in preparing the dyes wanted for the industry. Cheap dyes made locally will make us independent of the foreign supply and improve the prospects of both the yarn and the cloth industry.

The extensive use of hydro-electric power in mills will encourage development by reducing the cost of production.

It is also necessary to train our own men as mill managers, supervisors and skilled workmen. The employment of foreigners in the higher ranks as at present entails an expenditure too heavy for the industry. They should be gradually replaced by Indians with the requisite training and skill. That will have the surest effect of reducing the cost of production, and a corresponding increase in the margin of profits would follow. The larger profits would attract more capitalists into the industry and more mills would be erected in the natural course of things.

The question of mass education likewise is important to the cotton industry. Some sort of general education would, if anything does, increase the efficiency of the operative—a great point in Indian industry.

Two more measures would offer the greatest encouragement to the cotton industry here, both having for their objective the more profitable utilisation of waste products. The cotton seed and the waste cotton could be made to yield a much larger income to the mills than at present. Now both these materials are exported to the West where they help to maintain two lucrative industries. The cotton seed oil industry is a growing industry on the European Continent and in America, and Germany uses the waste cotton for various industrial purposes. These industries can be introduced in India with considerable profit to the people in general and to the Indian cotton manufacturers in particular. The ginning mills would make larger profits over the seed and the spinning and weaving mills over the waste cotton. With increased competition in consequence of the increased profits, ginning would be done cheaper in time, and that will keep down to some extent, however slight, the price of baled cotton such as is used in the spinning and the weaving mills.

Q. 111.—In my opinion the following industries could be either introduced or developed in India without any great trouble and with immense gain to the people and the country;—(1) expression of cotton seed oil, (2) glass manufacture, (3) match manufacture, (4) manufacture of dyes, colours, paints and varnishes, (5) jute cloth manufacture for shirting, (6) manufacture of chemicals, turpentine included, (7) carpet-making with waste cotton, (8) porcelain manufacture, (9) distillation of potable spirits from paddy, (10) manufacture of cheap manures from animal and vegetable matter, (11) manufacture of margarine, (12) manufacture of vegetable silk from rhea and other suitable materials, (13) utilisation of by-products of coal, sugar, etc., and (14) manufacture of the yarn used in making Kasi silk.

ORAL EVIDENCE, 12TH DECEMBER 1916.

President.—Q. In answer to question 102 you say that nothing has been done in Bengal towards ascertaining the possibilities of developing hydro-electric power and that investigation should certainly be made in the matter. Do you know of any proposition for hydro-electric power?—A. I know nothing about it.

Q. Schemes have been investigated in Sikkim?—A. I know nothing about them.

Mr. C. E. Low.—Q. Where is the Empress of India Cotton Mill situated?—A. In Calcutta, some 14 miles southwards.

Q. Are the shares quoted?—A. The shares were quoted. The mill has been burnt down now.

Q. Have you had any experience in promoting light railways?—A. No.

Q. Have you seen anything of the Indian firms promoting light railways in Bengal?—A. Yes.

Q. What degree of success had they in raising capital?—A. They have an English name attached. I am referring to Martin & Co. They have done a good deal of work with success.

Q. You have known other firms?—A. We had these light railways carried out by Bengali gentlemen here, and I think, they have done their part of the work very nicely.

Q. Did they succeed in getting capital?—A. I do not think there was much difficulty in raising capital.

Q. From what classes of people? From the bhadralogs?—A. Yes.

Q. Where did the money for the Empress of India Cotton Mills come from?—A. Our money as well of other Indian and European gentlemen.

Q. Has money come from the Bombay side?—A. Not a single rupee from Bombay; all from Calcutta side. When I say Calcutta side, I mean Bombay people located in Calcutta and doing business in Calcutta.

Q. Supposing you have a successful industry in certain provinces and supposing the Bengali people are not very ready to take up industries, would it be justifiable to give a demonstration of an industry in another province in order to help the Bengali people to take it up?—A. That is exactly what I mean. The industry might be flourishing in one large town, but that should not prevent the Government from coming forward to give their aid and making practical demonstration in out of the way places. Take for instance the match industry. Look at the amount we are importing from Japan and other places. If this industry had been taken up by Government and demonstration factories were started, the poorer classes of the people would certainly take them up and the people would be greatly benefited.

Q. Speaking about the Ambala Glass Works you give a rather incorrect idea as to its financial position. They are going very strong?—A. Possibly these are new works that you are speaking about. Then I do not know about them.

Q. You say that it must not be open to a few shareholders to force a bank to go into liquidation. Are you aware that the Companies Act gives considerable discretion to the judge to refuse such applications?—A. That is what I think, and that is why I have made that remark.

Q. Do you think that the judge is too ready to accede to insufficiently supported requests of that sort?—A. That is my idea.

Q. Have you any specific instances in your mind?—A. I have in mind the case of Har Kishen Lal of Punjab. Had not such a rush for money come upon him he would still have been able to go on.

Q. Do you think that Har Kishen Lal's case is an instance in favour of the relaxation of the present provisions of the Companies Act?—A. I think so.

Q. Have you seen anything of the Commercial Museum in Calcutta? Could you give us any criticisms or suggestions for making it more effective. In what way could it be developed?—A. It is very popular. But very few people know about it. The museums must be accessible to the lowest classes so that all may profit by them. I think no effective use has been made of them.

Q. Do you think there should be more of them?—A. There should be more of them and their existence made known in all the vernaculars so that the people may know and profit by them. Knowledge must filter down.

Q. Do you consider that its present site is not suitable? Do you think it should be located in the business centre?—A. The site is suitable. It should not be a mere show. It should be a medium of instruction.

Q. It is a commercial museum, and not an industrial museum. Do you want greater publicity regarding its contents?—A. Yes, and regarding its uses also.

Q. Have you seen of instances where it has been of use?—A. It has been of great use in cases where we are bent upon going into any particular thing. But at the present moment the lower classes have hardly made any use of it.

Q. Regarding your apprentices, what degree of education had they?—A. Ordinary education up to the matric standard.

Q. Did you find that that education was of assistance to them in picking up their work?—A. I think it was of very great assistance.

Q. How is the training in the college of commerce supplemented by practical training?—A. What I have been told here is that after coming out from the Bombay school they have been apprenticed in the factories and private firms, and they have proved a success.

Q. Is that apprenticeship looked on as a part of the college training or do they get these appointments themselves?—A. That is a subsequent idea. After acquiring certain knowledge in these colleges they go to finish their education in a practical way in some college or other.

President.—Q. The information that I got in Bombay was that no graduates have been passed out of these colleges. Their course is one of four years and they have done only 2½ years. You just told us that they had come out and had become apprentices and that they were successful. Is it possible that you might be referring to the Victoria Jubilee Technical Institute?—A. That is the information that we got in Calcutta.

Mr. C. E. Low.—Q. Why was the Government School of Commerce in Calcutta found to be unsuccessful?—A. The candidates turned out were not to my knowledge capable men.

Q. Have you seen any of those?—A. They came for employment. They were quite mediocre.

Q. What did they learn?—A. Shorthand, Typewriting, Book-keeping. I for one would not entertain their services at all.

Q. Were they badly taught or were they not taught long enough?—A. I do not know about the teaching that goes on there. I found these men not up to the mark. I cannot blame the method of teaching without knowing the facts.

Hon'ble Sir Fazulbhoj Currimbhoy.—Q. Many of the witnesses have told the Commission that the banks do not give money to Indians in starting enterprises. Does the Bank of Bengal give advances on security which is good?—A. I think they give on Government papers and port trust debentures and things of that kind. It all depends upon the personality of the firm applying for loan. The question is a broad one, and it must be narrowed down to its proper limit. I think firms having a reputation have no difficulty in obtaining money.

Q. Even if they are Indian?—A. Indian firms are not very many in number.

Q. They do not refuse because the firm is an Indian firm?—A. You will see from my statement that I say that everything depends upon the personality of the applicant. If a Bengali goes and asks for it, he will not get it. But the Bombay people can command anything. That is a positive fact.

Q. You mean in Calcutta?—A. Yes. If I go to the Bank of Bengal, I can get any amount I want.

Q. You say that existing industries must be protected and new industries established with Government aid and if in this scheme of State assistance individual interests suffer, we must boldly face that contingency. What is meant by individual interests?—A. If you are starting an industry here which has to face competition with a foreign industry, then I say that Government must aid that particular industry.

Q. You say that there should be an Imperial Board of Industries and business men must be taken on it. How should they be taken?—A. There might be a regular Board of Industries in the headquarters of the Government of India. I do not mind where it is so long as it is in India.

Q. How can you get business men to go to Delhi and remain there for twelve months without making their private interests suffer?—A. I mean in the way that your services have been obtained for this Commission. If business men are paid well, they will be ready to serve.

Q. Supposing you had Board of Industries, one in Bombay and in Calcutta and so forth, and if these Boards assisted the Director of Industries of those localities and if their recommendations went to the Imperial Director of Industries, would that not be better?—A. What I say is this. You have an Imperial Board of Industries and there are the several Directors of Industries in the provinces. You may give them an Advisory Board but the Director must be the supreme man. There should be no red tapism or correspondence. Too many cooks will spoil the soup. Such a thing should not be done.

Q. Have you got a Board of Industries?—A. I do not think we have any here.

Q. And then with regard to the long staple cotton, why do you want Government aid?—A. Formerly we used to spin cotton of a very high standard, but we also used to make muslins of such superior value that they could not be manufactured even in Great Britain. This is now a dead art in India. That ought to have been revived. I know cases where Government has been giving help. But it is on a limited scale.

Q. Are these ginning factories here making huge profits? What profits do they make?—A. I could not tell you. They make a good percentage. Ten per cent. of profits. That is my information.

Q. When you started this Empress of India Mills, you started with spinning?—A. Only spinning. Within the first three years we made cent. per cent. of profits and increased our mill by nearly half.

Q. Is there a prospect for the cotton industry in Bengal?—A. I think there is a prospect for it in Bengal also.

Q. Where do you get your cotton from?—A. We get in Bengal itself, and also from the Central Provinces and from the western districts.

Q. You get the cotton from the western districts and do you think you can stand competition from Bombay side?—A. Do you mean for spinning only or for weaving also? If you take weaving into consideration, then I think Bombay has the advantage over Bengal.

WITNESS No. 136.

Mr. M. M. S.
Gubbay.

MR. M. M. S. GUBBAY, C.I.E., I.C.S., *Controller of Currency, Calcutta.*

WRITTEN EVIDENCE.

I should explain at the outset that the opinions expressed in the following memorandum represent my own personal views, and are not based on any instructions from Government.

FINANCIAL AID TO INDUSTRIAL ENTERPRISES.

Q. 4.—With reference to question 4 under this head, I may explain that a number of Government cases in which Government aid to existing or new industries was given, or sought for, came up for consideration while I was serving in the Commerce and Industry Secretariat and in the Financial Secretariat, and in the ordinary course of Secretariat procedure it was necessary for me to examine these proposals and to form an opinion as to their merits and the expediency of extending or refusing the assistance sought for, or of modifying the form in which such assistance should be given. As to the various methods of giving Government aid as detailed in question 5, I am disposed to think that the circumstances of each particular case must necessarily largely determine the particular form of assistance to be extended. Thus, for instance, while in some cases a guarantee of Government purchase of products for limited periods might be the most suitable, or a suitable form of assistance, such a method cannot invariably be applied, or might prove, if the Government demand can only be for a limited quantity, to be inadequate. Again, the supply of machinery and plant on the hire purchase system appears to me a suitable form of assistance in the case of smaller industries or for experimental purposes, but could not clearly be adopted as a satisfactory method in all cases. I am not in favour of out-and-out money grants-in-aid, or bounties, or subsidies, which are the first two methods in question 5, as I do not believe either that Government can satisfy themselves, or the industrialist could satisfy Government, without inquisitorial enquiry that the money was being, or had been, legitimately expended on the purposes for which it was professedly taken. Generally speaking, where, and if, Government assistance is to be in the form of financial help, my feeling is that, wherever possible, the following two conditions should be observed :—

- (1) The whole financial risk should not, in my opinion, fall on the State, *i.e.*, the industrialist must take his share of such risk, though it need not necessarily be equal to the share which the Government is to take.
- (2) The Government assistance should be repaid, when, and if, the industrialist's effort has reached a stage at which his enterprise has become ordinarily remunerative and brings him in an adequate return.

It may, however, be advisable and possible that in the case of the smaller individual industrialists, whose case can suitably be differentiated from those in which Government assistance is sought for concerns appealing to the public for subscriptions, the model of the assistance which Government places at the disposal of agriculturists in the way of loans at a reasonable rate of interest might be adopted.

As regards the Government control in cases where financial help is extended by the State, I do not personally attach much value to the presence of a Government director with defined powers on the Board. In such cases I should prefer to see a limitation on the powers of the directors in respect of their powers to embark on fresh financial liabilities, and a regular system under which the proceedings of the directors would be automatically reported to a Government officer or department, presumably the Director of Industries. In all cases it should be a condition of the grant of financial assistance that a Government officer or department should have access at all times to the proceedings of the directors or the manager, and the latter should be encouraged or probably required to work in close personal relationship with the officer or department referred to above.

Reverting to the question of Government purchase of products for limited periods, this method might, I venture to suggest, be more freely utilised than hitherto. I observe that the Commission have invited criticisms in regard to the working of the present rules regarding the purchase of stores by Government departments. I believe that there has always been a feeling in respect of these latter rules that they unduly favour purchase through the India Office: at any rate, this was certainly the case at the time when the Stores Committee was investigating the question of the amendment of the then existing rules.

Q. 10.—With reference to question 10, I am of the opinion that the creation of new banking agencies, in order to give assistance to industrial undertakings, is a pressing problem. The existing banking agencies cannot, having regard to the class of business which they now undertake, be expected to finance industrial operations in regard to which a quick return of the money advanced is not to be expected. It might be necessary to impose, as a condition in the case of such industrial banks, that they should not receive deposits at call or at short notice.

III.—ASSISTANCE IN MARKETING PRODUCTS.

Q. 28.—The Calcutta commercial museum is, I understand, based on an experiment which was started shortly after the outbreak of the war by the Board of Trade and with which I was closely associated at home. It differs, however, from the home model in many important respects into which I need not perhaps enter. I have no doubt from the developments which have followed on the Board of Trade experiment that these sample exhibitions—as they were known—met a very definite want in the industrial organisation of a country like England; but my feeling is that so far as India is concerned the stage of industrial development at which such institutions can play a full part has not yet been reached. In any case, care should be taken to prevent the samples shown at the commercial museum in India from becoming antiquated and out of date, and they should be renewed as frequently as

possible. There is also always a risk of exhibitions of such samples serving merely a spectacular purpose : and this should be guarded against.

Trade representa-
tives.

As regards trade representation of India in Great Britain, the Colonies and foreign countries, I believe that it is very necessary to secure Indian trade representation in London without delay ; but I think that similar representation in foreign countries and the Dominions might well wait. Looking back to my experience in London between September 1914 and February 1915, there was ample evidence that the appointment of an Indian Trade Commissioner filled a very necessary want. Just in the same way as the Board of Trade have found it necessary to open a City office to deal with commercial enquiries as regards tariffs, statistics, etc., so also for this purpose alone there should be representation of the India Office in the city. Also having regard to the numerous inquiries which reached me from Indian traders, desirous of entering into business relations with home buyers or sellers, it is clear that the present arrangements do not adequately meet all needs. But a far more important requirement is, in my view, to provide manufacturers or capitalists who are interested or likely to be interested in the purchase of, or the development of, Indian products with the facilities of ascertaining the preliminary data without which their operations cannot be begun or extended. It is at present a matter of sheer luck if on referring to the India Office an enquirer in England can be put into touch with some Indian official on leave who is competent to reply authoritatively to the enquirer. A considerable amount of routine information is undoubtedly available at the Commercial Intelligence Branch of the Board of Trade, and lists of persons or firms in India, classified according to the nature of the business in which they are engaged, have been drawn up and are furnished to enquirers. For the rest, however, the enquirer is left to pick out from this list any name that he may select and to get into communication with the firm or person in question. Where such information fails to satisfy the enquirer, he is recommended to communicate with India. In the case of the Dominions the presence, at all times, of commercial representatives of the Dominions in the City and also, at frequent intervals, of British Trade Commissioners, who are allowed to spend a certain amount of time in England, secures that an enquiry as to trade openings will be promptly, authoritatively and adequately dealt with. A similar provision is required in the case of India : that is to say, there should be a properly equipped and qualified office, whose function should be to deal with Indian trade or commercial enquiries big or small. It is true that we do not need to advertise India for the purpose of attracting settlers as in the case of Dominions : but it is necessary that we should advertise the resources of the country. We need to introduce some suitable method of attracting attention to these resources, and to the very complete data which many Indian scientific departments have put together as to the possibility of commercially exploiting these resources.

In my view the Indian Trade Commissioner should have recent personal experience of the country ; he should have, if an official, filled appointments which have brought him into touch practically in the course of his official duties, and not merely as a Secretariat officer, with Indian commercial firms and Indian commercial and trade questions ; he should, if an official, be of sufficient standing to carry weight with the India Office and other Government departments at home, as well as to admit of direct communication between him and departments in India. There should, I think, be a limit to the tenure of the appointment, and in the case of an official, it should not be regarded as an appointment to be held indefinitely after retirement. There need be no reason for limiting the departments from which this officer could be recruited. Indeed it is probable that a department like the Geological Survey, the Forest, or the Agricultural department, would frequently offer the best field of selection. The Trade Commissioner should be authorised to communicate with officers on leave who might be in a position to advise on any particular enquiry. In the initial stages of its development, the appointment should be attached to the Commercial Intelligence Branch of the Board of Trade, so as to pave the way for the introduction of a satisfactory system of the relations between the Trade Commissioner and the business community of London and other manufacturing centres. Subsequently, however, it seems to me that it would be possible to leave the Trade Commissioner to his own resources. With the appointment of such a Trade Commissioner it appears to me that the arrangement with the Imperial Institute may need to be revised, and I am certain that it will need to be clearly defined. The Imperial Institute at present in an undefined sort of way assumes that all commercial intelligence enquiries relating to Indian products should be directed to it. This appears to me to be a very unsuitable arrangement, as the Imperial Institute is situated at a distance of 3 or 3½ miles from the City, and whatever attractions the Imperial Institute may possess from any other point of view, no body could claim that at this distance from the City, it is an ideal site in which to locate a commercial intelligence office. Moreover, the absence in the staff of the Institute of knowledge personally acquired on the spot of Indian conditions or Indian commercial men, appears to me to establish conclusively the undesirability of entrusting to it the trade representation of India. The Trade Commissioner would, of course, be subordinate to the India Office, but it is essential that he should have the right of direct communication with India in respect of his work.

GOVERNMENT ORGANISATION FOR THE COLLECTION AND DISTRIBUTION OF COMMERCIAL INTELLIGENCE.

Commercial
intelligence.

Question 83 has reference only to the system of collecting and distributing commercial intelligence, and I do not know whether the following remarks may be regarded as falling

within the scope of that question. There has been in the past, on certain occasions, what may perhaps be correctly described as a tendency to regard commercial intelligence work as including the giving of advice and encouragement with the ultimate object of effecting the development of possible industries. One particular result of this tendency has naturally been that enquiries and investigations have been started in different localities by the Director-General of Commercial Intelligence to enable him to fill this role of adviser. My personal view is that in this respect there has been a wrong conception of the functions of a Commercial Intelligence Department, and that the question of developing industries should be regarded as entirely outside the scope of the functions of that department. I should like to see a special Imperial department or departments created on the analogy of the model of the Geological Survey, or the Forest, or the Agricultural department with a fully equipped staff of experts to be placed, when required, at the disposal of the local Governments to deal with industrial problems arising in their provinces. With the creation of this department it will be possible for the Commercial Intelligence Department to devote itself to its proper functions which primarily are :—

- (1) To divert to the proper and competent authority enquiries which reach it; and
- (2) to assist in the marketing of the products of local industries by bringing buyers and sellers together.

ORAL EVIDENCE, 13TH DECEMBER 1916.

President.—Q. Your written evidence is so clear that I don't think we shall have to ask you any questions in the way of supplementing it; but there is one point that I should like to ask you to consider again, so as to be quite sure that we have your views. I refer to your remarks under "Trade representatives". Referring to the Indian Trade Commissioner in London, you suggest that there should be "no reason for limiting the departments from which this officer could be recruited. Indeed it is probable that a department like the Geological Survey, the Forest, or the Agricultural department, would frequently offer the best field of selection." Unless the Geological Survey has improved more rapidly, since I left it, than I expect, I should not think that an officer of that department would be a capable representative of general trade, if he remained a good geologist at any rate; but I should imagine that an officer of the Geological Survey might reasonably be attached to this Trade Commissioner, and I should like to know whether you think that it would be better this way. Or would it not be better to attach a geological officer and a forest officer and an agricultural officer to this Trade Commissioner partially to give information regarding conditions in India, partially to pick up information from people at home, in order to convey that information back to the department of India carrying on researches, and also that he may bring back the information afterwards when he returns to research work? Do you mean by this that you would actually select officers to act as trade representatives in London?—A. The object of that particular sentence in my evidence was to make it clear that I did not regard it necessary to restrict the selection to the Civil Service, and that it might be possible to find a qualified officer in other Imperial departments which come into contact with commercial men and commercial problems. The Geological Survey at any rate to my knowledge has had, at least two officers who, to my mind, would have been as well qualified as anybody to represent India. If the Trade Commissioner were at any time in need of assistance from the Geological Survey, or one of the other departments mentioned, I should most certainly suggest that he should have assistance as proposed by you. In fact, I go on to say that he should be authorised to communicate with officers on leave. He might have an enquiry which would necessitate a reference to a technical department, and he ought to be authorised to call on the services of officers of that department. I would adopt your suggestion of having an officer attached, but the main point I wanted to make there was that there is generally an impression that these appointments of Trade Commissioner—or any of these Commercial Intelligence appointments in India—are necessarily restricted to members of the Civil Service, or some Imperial department, such as the Customs. In my view there is no necessity for such restriction. The best man ought to be taken, whether he is an official or not an official; and it was in order to expand that idea that I quoted as an instance those three departments. I should, perhaps, have made it a little less down-right. I might have suggested, for instance, "it might conceivably happen" that suitable men would be found in those departments.

Q. You would replace the word "probable" by "possible" or "conceivable"?—A. Yes.

Q. I understand when you make the suggestion of one Trade Commissioner it is really made with the view of economy; that is, you would not hope to get more than the one Trade Commissioner in London. Do you think that the business that could be done by this Trade Commissioner would be sufficient to warrant the appointment, not only of a Trade Commissioner, but of two or three technical officers associated with him?—A. Eventually I should hope that he might want the assistance of more than one. In the early stages I think he would have to go slow.

Q. But if you don't associate with him the kind of officer from India who can give up-to-date and accurate information of a technical kind, and who cannot deal on equal terms with the specialists who will be advising firms in London, don't you think that if you appoint a

single Trade Commissioner without these trade officers, he will be handicapped from the beginning, and consequently give the post a bad name. For instance, there must arise questions like the case of a mining company wanting to know conditions of mining in a particular area. The Trade Commissioner, if he were not a member of the Geological Survey, would practically be compelled to refer questions of that kind either to India or the India Office. Any information he would give would be information of a second-hand type out of books or from somebody in India, and there would be delay in any case. If you had a geological officer attached to this Trade Commissioner, the geological officer could be called in and the point discussed on the spot with the technical officer of the company in London. Would that not offer a greater chance of success?—A. Quite so, I quite agree in that.

Q. Otherwise don't you think there would be danger of the post being misunderstood; in other words, is it not dangerous to begin on too small a scale?—A. It is entirely a question of having men available, if these departments could spare a man; and it is also a question of financial economy. I think your suggestion is the ideal one, and one would like to see it adopted straight away, but I doubt whether the technical departments in India could indefinitely spare a member of their staff to be attached to the Trade Commissioner. They would have to be increased. All the scientific departments in India seem to me to want a considerable amount of strengthening, and if you postulate that there will be such an increase, and financial conditions don't stand in the way, I certainly agree to a larger organisation on the lines that you have indicated.

Q. It would only be an increase, in the case of the Geological Survey, one, Forest, one, and Agriculture, one, to meet this minimum of three specialists attached to the Trade Commissioner in London. That would not be a very large department to make?—A. You know more about the Geological Survey than I do. I have only seen it from the Secretariat point of view and I know nothing about the possibility with the staff at its present strength of detaching an officer from the Forest and Agricultural Departments. But I have always understood that the Geological Survey was working with a limited number of men. We could, from the business point of view, afford to expand that department considerably, and probably should do so. If that is granted, I entirely agree with you, regarding the attaching of specialists to the Trade Commissioner.

Q. Of course, so far as we are concerned, it is not a question of "can" or "cannot"; we have to decide whether the demand is worth it, and lay that matter before the Government. It is for them to find the means. What I had in view was a scheme of this kind, that these technical specialists should be attached to the Trade Commissioner, not permanently; in the case of the Geological officer for 2 or 3 years, and the Forest and Agricultural officer possibly two or three years too. They should be senior enough to have a good knowledge of India, and they should be junior enough to apply to India the lessons they have learned as technical attachés to the Trade Commissioner in London; in other words their service in London would be a form of study. They would be learning as much as they would be teaching, and they would come to India full of tips that would be useful in developing research work in India. That is the kind of officer I had in view. Do you agree with me that a retired officer is more a danger than anything in giving advice about India?—A. Entirely. I have also said in the case of the Trade Commissioner, that there should be a limit to the tenure of the appointment. He should not remain there for ever, but should come back to India. The Trade Commissioner should also conform to those standards you have laid down with regard to the technical officers. He should be of sufficient standing to carry weight at home, but not so senior as to regard the appointment as the end of his service.

Q. Now that we have got this new picture before us, can you tell us whether the enquiries made of you are of a kind that would justify the Government in having not only a Trade Commissioner but three technical specialists attached, *i.e.*, if you had a Trade Commissioner alone would he really be misunderstood unless he was an exceptional officer, and would his post not only be of little use but would he be likely to be regarded with disfavour by the mercantile community particularly, because he would not be able to give prompt information, especially because any information he gives in matters of forest or agricultural products must be second-hand?—A. I think that, in a very short time after the creation of a Trade Commissioner so assisted, the results would be amply justified. I would not say that, when the office was created, you would see the results in the first two or three months, but I am perfectly convinced that within a year, with a carefully selected personnel, it would amply justify its existence.

Q. I want to get a little further than that. I want to know whether it is not, under normal conditions, dangerous to start with a single Trade Commissioner. He may be an expert in one subject, he cannot be an expert in all?—A. There is a risk undoubtedly.

Q. Of course we know that there were exceptional opportunities for you to be in touch with these departments, and you were also dealing with problems under war conditions. The conditions were not exactly the same, but you can form some picture of the kind of questions that will come before the Trade Commissioner, and I should like to know whether you think it would be safe to start with one Commissioner or—whatever the future may bring—it would not be safer to start with a Trade Commissioner *plus* three technical specialists?—A. Of course the answer is, it would be safer to start with three. You take a risk in starting with one, and the risk may be very serious. I mean the appointment may be entirely spoilt from the very beginning.

Q. You think we should be justified in urging this matter on Government as a very serious proposal; that it would be dangerous under normal conditions to start with one Trade Commissioner in London?—*A.* I considered that when I was there. I felt considerably handicapped in not having an expert to refer questions of any particular kind to. So far as my opinion carries any weight I think the Commissioner could say that they have had this point put to them as follows: the creation of an office of Indian Trade Commissioner so organised as to give him the assistance of a number of experts can certainly be regarded as the safest form of carrying out that particular policy; anything short of such an organisation entails a certain risk, and the risk is probably so great that it would be better not to take it.

Q. Don't you think that this Trade Commissioner ought to be a man who pushes Indian interests and does not act merely like a post office?—*A.* Yes, the whole thing rests on the question of personnel.

Q. I wonder if you have in your mind, as a Financial officer, the difficulty of getting a proposal through; from the financial point of view you know the tendency there is in every Government department of beginning on a small scale and growing. I want to know whether beginning on too small a scale is not really dangerous; whether you are not bringing about your own condemnation?—*A.* I don't think I am coloured in my views so much by the fact that I am an officer of the Financial Department; possibly my natural characteristic of caution predominates.

Q. You will admit that caution can be so overdone that it becomes a handicap?—*A.* I entirely agree with that statement.

Mr. C. E. Low.—Q. In reply to question 4, you say, "I should prefer to see a limitation on the powers of the Directors in respect of their powers to embark on fresh financial liabilities, and a regular system under which the proceedings of the Directors would be automatically reported to a Government officer or department, presumably the Director of Industries." Outside their Articles of Association or outside anything specifically laid down by Government? Suppose their authorised capital was 10 lakhs, and they had already called up 5 lakhs; would you forbid their calling up all their authorised capital, or would you forbid them to apply to Court for power to increase their authorised capital?—*A.* I had not in my mind anything connected with the Articles of Association. What I really meant was the financial liabilities which they undertake in connection with the ordinary working of their business. I mean that it is conceivable that having received Government assistance, and having expended it, they wanted further funds to carry on, and might then go to some other source for these funds.

Q. You mean with reference to their ordinary business working?—*A.* Yes. To translate it into official language, the prior sanction of the Director of Industries should always be taken to any expenditure over a certain figure.

Q. You have had suitable experience with regard to the Stores Department, because I believe you were a member of the Stores Committee; are you prepared to put forward any suggestion that would encourage industries in this country by any modification of the Stores rules? As you are aware, the suggestions of that Committee were not accepted in full?—*A.* No, and you know the reasons.

Q. Are any of the suggestions which you made, and which have not been carried out, such as you think might reasonably be accepted?—*A.* I am inclined to think that, generally speaking, the method of getting purchases from home is the easiest method for the department concerned. I mean we have been so accustomed to being able to indent by telegraph, and there has always been a very responsible official at the other end who is always ready to send out as much as is required, and therefore it is the easiest line of resistance. To get supplies in India requires a certain amount of beating up people for information, and of taking steps to see that one is not being done; whereas the articles which come out from home are supplied on the authority of someone else, and if you are not satisfied, you complain and the article objected to is replaced.

Q. That position is with regard to ordering stores from the point of view of the official who orders it. Supposing you look at it from the wider point of view of helping industries in this country, could not that responsibility, which you allude to, be taken off the ordering official by some such device as a Stores Department in India?—*A.* I had not thought of it in that way, of a Stores Department for the whole of India. Now that you mention it, I recollect that the point was discussed particularly in connection with the supply of the Military Department stores, and the question of creating a Director of Contracts arose. It was, however, thrown out, I am not sure on entirely sound grounds. Roughly speaking the Stores Committee inverted the language of the rules which previously had been to this effect, that everything must be obtained from home, unless you can get the thing in India at the same rate. We suggested inversely that nothing shall be got from home if you can get the same thing in India.

Q. With regard to the suggestion of having a Stores Department in India, is it not clear that the Indian producer is handicapped by the distance of the Stores Department here, while the Stores Department in the United Kingdom affords a considerable degree of artificial assistance at a cost which is never taken into account?—*A.* He is positively handicapped, because he is not allowed to tender simultaneously with the home people. If an order went home for a certain quantity of articles, the Indian producer would not be allowed to tender simultaneously with the English producer.

Q. With reference to your answer to question 10, supposing it were decided to start industrial banks, have Government at their disposal any funds from which they would, in normal times, be able to help the bank by placing any guarantees at their disposal? I invite your attention to the last sentence of your reply about the difficulty of using money for industrial purposes which is deposited at short call.—A. It is understood, of course, as put at the beginning of my written evidence that these are purely my personal views. This is a matter on which, if you were to press me for a reason, it would be difficult for me to state my reasons without definite authorisation, and therefore I could only give you an opinion without being able to give you the reasons therefor. An authoritative statement would not be of any particular value to the Commission, and would be no basis for rebutting contrary opinion if such was given.

Q. Have you formed any views about the usefulness of this Calcutta commercial museum, in respect to the following points: do you think its site is the most suitable, or you don't know Calcutta well enough to express an opinion?—A. I think that the site *qua* site is centrally situated in the business quarter, and it has the advantage of being in a Government office.

Q. That is, as you very rightly say, an advantage. It is in a business quarter, but is the quarter the kind where business is carried on which is the same kind of business that the museum is trying to facilitate?—A. Candidly I have never been quite sure as to the object of that museum. As far as I can recollect, the museum was intended to carry on in India an experiment carried out at home. The experiment at home was on entirely different lines.

Q. We may assume that the most useful functions it is fulfilling is helping the sale of certain Swadeshi industries, and that it is undoubtedly doing this to a certain extent?—A. Are you referring to retail sale?

Q. It puts the producer in touch both with wholesale and retail purchasers in certain cases. Possibly if it was removed to a different kind of business quarter, would it not be likely to effect that purpose better?—A. I think so. The retail sales effected through it would be undoubtedly increased, if it went into a quarter where the retailer was selling other people's wares.

Q. And its wholesale transactions?—A. Its wholesale transactions conceivably could be just as well done where it is situated at present.

Q. Do you think that the kind of man likely to buy, whether wholesale or retail, would be as likely to come up to the first floor of a Government office in Council House Street as he would on the ground floor of an office in Harrison Road, or Bowbazar or Bentinck Street?—A. Does the wholesaler want the same sort of attraction as the retailer? I take it that the wholesaler can just as easily go round to Council House Street and see what is being offered there, make his own choice as to the suitability of an article, and then proceed to get into touch with people who can supply it. The retailer is rather a different person. He is probably living from hand to mouth and would like to jump into a place and say, "I am short of this particular thing, can I have anything like it?" We found at home that the wholesaler would not come into any place where a retailer came. Until we gave a guarantee that retailers would not be admitted, there was no chance of our making a success of our experiment. None of the manufacturers nor the wholesalers would touch it. I am not at all certain what the Calcutta commercial museum is intended to effect.

President.—Q. I asked if they kept a record of the people who went into the museum, and they said they did at first, but gave it up. I suggested that it was an important matter to keep that record, so as to know what class of men went to that museum, and what class they were serving. Don't you think it would give us an idea how the museum was being used?—A. I entirely agree. We did not allow free admission to our thing at home. Admission was only on ticket, and record of any business put through was always given to us.

Q. You think it would be better used if there was a definite field for using it?—A. I think if the privilege was in some way restricted, it would probably be more appreciated. In these cases a certain degree of restriction gives the thing more value.

Mr. C. E. Low.—Q. Do you think that the opening of other museums, say, another one in Bombay, would be an advantage; or if not in Bombay, perhaps in some other large town?—A. I am very sceptical.

President.—Q. In Bombay there is a Swadeshi stores run entirely on commercial lines, and I believe the stores pays. Their business is mainly retail sale over the counter, and by V. P. parcels; so that we have two things going of a totally different type, the Calcutta commercial museum, which, so far as I can conceive, deals with wholesalers, and the Swadeshi stores in Bombay which is effecting retail trade. Would it be possible and advantageous to have two such institutions in a town like Calcutta, the commercial museum where it is, and the Swadeshi stores in Harrison Road, either undertaken as a private enterprise, or assisted in some way by Government?—A. How would you fill the Swadeshi stores?

Q. You mean with goods? They at present have a very big variety in Bombay. You can buy practically anything you want. They have an illustrated catalogue. I don't know where they get the material from altogether. It has an illustrated catalogue which is got up admirably.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. We send our goods there as samples, and they are kept there and sold. Other factories send sample things, and if they have to have a bigger lot,

if it is in demand, they ask us to send some more, and we send them. They are selling lakhs of rupees worth of goods?—*A.* I take it that your samples are not put under glass cases, but are shown in such a way that people can handle them?

Q. Yes, every article you can handle. Sometimes we have to give two or three hundred bales when we send two or three pieces there. They have got the proper staff to communicate with up-country people?—*A.* That is a different thing to a museum.

President.—Q. That is why I am putting this before you. You don't know the Bombay model and probably cannot form a clear picture of the conditions? From what Sir Fazulbhoy tells me, it is very much the same kind of arrangement we had at home. We had a big room and everybody who wanted a particular kind of article to be manufactured would send a sample, and the manufacturer would come and say that he would make or would not make it. We got into touch with makers who would manufacture from samples. We got samples from people who sold a particular kind of German article. The manufacturer would come and look at it and say, "I can do this," and the firm who had sent the samples would then go into the question of cost, etc., with the manufacturer. For this purpose, they would go into a private room and discuss terms of business, and the thing went through. It was not a case of show cases with gold letters and things ticketed. That really reveals to us three types; the one here, the commercial museum; the one in Bombay which is very attractive to the ordinary retail buyer, and the scheme which you describe in London, which has attracted the wholesale dealer?—*A.* Many wholesale dealers found their sources of supply cut off with the outbreak of war. We tried to put them in touch with the English manufacturers who could make the goods.

Q. Then is it your view that the commercial museum ought to be reformed and made more in accordance with the London model which you found successful?—*A.* We want to know clearly what the commercial museum is going to do. When you know what your object is, then you can sit down and consider means. If it is a question of retailing products of our Indian manufacturers, it seems to me that the model Sir Fazulbhoy describes is the one to follow. It should be situated in the bazar, and the supply of samples should be left to the firms to send. Really what you would then provide would be a sample room where a man could see all he required at one go, instead of having to go round and see a large number of different people; and I am entirely in favour of that.

Q. Is it your opinion that the commercial museum suffers from the muddling of two distinct lines of policy?—*A.* It seems to me to be the case. My view is simply based on what I have heard from people who created the museum.

Mr. C. E. Low.—Q. In your final paragraph you speak about the Commercial Intelligence Department diverting to the proper and competent authority enquiries which reach it; that is to say, if you have an Industrial Department you will turn it on to answer questions. With reference to the Indian Trade Commissioner, we have of course no Industrial Department at home. If we have one in India, do you think the Indian Trade Commissioner should give assistance to industrial enquiries either from the Industrial Department out here or from private individuals; with reference, for instance to the character of machinery available?—*A.* May I ask a first question; what is the Industrial Department contemplated?

Q. We don't know, otherwise we should not be here?—*A.* Then I find some difficulty in answering your question.

Q. We ought to assume that the department will be an efficient one with any number of experts and experimental appliances for solving such questions as can, with due regard to economy, be solved in this country. But all through the trend of the evidence has been to the effect that there would be certain things that could be better done at home, and there would also be the question of the supply of machinery. Do you think that the Industrial Department should, as a rule, correspond with the manufacturers of such machinery; or do you think that the Indian Trade Commissioner will be able to give substantial help to such department in conducting such enquiries? We may be in a position to say that the Trade Commissioner knows about certain things, and we would like him to call round on certain people and discuss further points with them?—*A.* I take it, this is the case you contemplate. You have an Imperial Department that deals with the chemical industry, and this chemical department comes to the conclusion that it wants a particular kind of machinery. It is to this extent in doubt in regard to it, that it does not want to commit itself; and wants to have advice from somebody at home. I don't see in that case how the Trade Commissioner can do anything more than place before him what information he gets from the manufacturers of the particular machinery. It seems to me in a case like that the chemical department should depute somebody home to make enquiries about the machinery required, if the enquiries are to be of a very real nature. If this is not the case, but it is simply a question of the placing of an order, it might go in the ordinary way direct from the Imperial Department to the manufacturers.

Q. That is to say, you don't think that, speaking generally, the Indian Trade Commissioner could be of great assistance on the industrial side of Indian work?—*A.* I rather doubt whether he could be of special assistance.

Q. In fact you are generally of opinion that the way in which, hitherto, our Commercial Intelligence Department mixed up commercial and industrial questions was really a very bad,

thing, and threw a considerable degree of discredit upon the commercial side of the office of the Director-General, Commercial Intelligence?—A. I entirely agree with that point of view, and in using the words “competent and proper authority”, I particularly had in view that there was a tendency on the part of the Commercial Intelligence Department to regard it as their business to tap the Imperial departments for information to enable it to answer an enquiry, instead of passing on the enquiry to the proper person whose business it is to deal with it.

Q. You will recognise that instead of their doing so, it is a great convenience to outsiders to be able to make all commercial and industrial enquiries through a single authority who will put them in touch with the right people to ask?—A. To put them in touch but not to pass on information which may not have been understood. There is always the double possibility of misunderstanding.

Q. You attach considerable importance to the definite separation of the functions of the industrial and commercial agencies?—A. Yes, I attach very great importance to that.

Hon'ble Pandit M. M. Malaviya.—Q. You say that the creation of new banking agencies, to give assistance to industrial undertakings, is a pressing problem. Have you any definite proposal to make about that?—A. I can only put it as I have done in this way that so far as things have come my way, it seems to me that there always has been some little difficulty in getting the existing banking institutes to undertake the financing of industrial ventures. It is not really their business as they are now constituted, which is the financing of commercial transactions. So far as the evidence goes, the facilities that exist are for the purpose of financing commercial transactions, which imply a quick return of money lent, and therefore they are not constituted for the financing of ventures which may involve a lock up of money.

Q. Are the financing facilities which exist sufficient even for commercial undertakings, in your opinion?—A. That question, I am afraid, I cannot answer.

Q. I see from the last Report on the operations of the Currency Department that the help which Government gives to existing banks does enable them to help commercial undertakings to a great extent?—A. Yes.

Q. The Government have been helping the Presidency Banks with their reserves for a number of years?—A. No, the position is that the Presidency Banks hold certain Government balances. But they only hold that portion which is not in the Government treasuries.

Q. What is the amount of the balance which was held this year in the Presidency Banks—four crores?—A. No, that varies from time to time. I don't think—except at the time when a loan is floated—it is ever as high as four crores at headquarters.

Q. I find it stated in “Capital” that on 2nd December 1916, it was 424 lakhs?—A. I think you are taking probably the balances in the reserve treasury.

Q. No, I am speaking of Presidency Banks; do you think I have made a mistake?—A. I think so; I won't swear to it.

President.—Q. Perhaps “Capital” has made a mistake?—A. I may say that the Presidency Banks' headquarters balances are daily reported to me and I see the figures from day to day but I have not seen them at four crores for some months.

Hon'ble Pandit M. M. Malaviya.—Q. Under ordinary circumstances the Government is under agreement to keep 70 lakhs in the Bank of Bengal?—A. I would not be quite certain as to the figure. I did not understand that you were going to examine me on this point, and I have not got the actual agreement, but I do not think, I mean roughly speaking, the balance that we keep at the headquarters of Presidency Banks—except at the time of a loan—exceeds 200 lakhs.

Q. Of which 70 lakhs is kept in the Bank of Bengal, 50 in Bombay and 50 in Madras?—A. Yes, those are, roughly speaking, the proportions.

Q. In actual practice does not the balance go up higher?—A. No, except when a loan has been floated. Ordinarily they vary; they are about two crores.

NOTE.—After the midday adjournment witness made the following statement on this point:—

I have verified that question which the Pandit asked about the Government balances at the Presidency Banks. He referred to a figure of four crores. I find that he included in the figure of four crores the public deposits at branches of the Presidency Banks. In certain places instead of having a treasury we have the Presidency Bank working our treasury and the money that they receive on Government account is treated by the Presidency Banks as public deposits. It is only received for the purpose of meeting Government obligations. It is not really free money. The really free money is that at headquarters. The amount of the Government balances at branches of the Presidency Banks is fixed by the Accountants-General with reference to the demand of the particular treasury and drawn away as soon as it exceeds a certain limit. It is the same procedure as that followed in our treasuries in districts where there are no Presidency Banks. The real balance which Government places at the disposal of the Presidency Bank is that at headquarters and that does not exceed ordinarily two crores.

Q. I find it stated in this Report on the operations of the Currency Department for the year 1915-16, that in order to provide Government with the necessary resources to enable them to place banks in funds, and also to meet any liabilities, power was taken at the

beginning of 1915 to increase the balance by £4 millions, by taking that sum out of the Paper Currency Reserve. Was that amount invested; was that power fully exercised?—*A.* £4 millions investments have been made. This limit was suggested in the first instance by the Indian Finance Commission, who said that among other things this increased power of investment would give us power to assist Presidency Banks, but we have not used it to assist Presidency Banks. All the assistance we have given has been from treasury balances.

Q. So far as commercial needs are concerned, do you think that the Presidency Banks meet them sufficiently well?—*A.* Yes.

Q. In regard to European business only, or both European and Indian?—*A.* Both.

Q. So far as you are aware, do Indian firms receive the same accommodation as European?—*A.* Yes.

Q. The cash balances in the Gold Reserve and Paper Currency Reserve are invested by the Secretary of State to a large extent in England?—*A.* You mean the Gold Standard?

Q. The Gold Standard and Currency Reserve?—*A.* No, a substantial portion of the Currency Reserve, 10 crores, has been invested in India.

Q. I find it stated in "Capital" that of the Paper Currency Reserve in India you have in :—

	Rs.
Silver coin and Bullion under coinage, and gold coin and bullion	6,55,22,645*
and in England, Gold Coin and Bullion	11,92,50,000
In Securities in India	9,99,99,946
In England	22,24,21,405

That shows that, roughly, you hold in India less than half of what you hold in England of this Paper Currency Reserve?—*A.* Yes.

Q. And in the Gold Standard Reserve too, you had in England—

Reserve held in sterling securities of the nominal value of	
seventeen million Pounds	£16,218,692
and Cash placed by the Secretary of State	£5,792,631?— <i>A.</i>

That is the Gold Standard Reserve which is different from Paper Currency.

Q. I know. I want to put them together. My Point is that you had a very enormous sum invested in England. Don't you think that you could, with advantage to industries in India, invest a fair portion of this in India?—*A.* The Gold Standard Reserve must be invested in England, must it not? It is to meet exchange, and you must hold it in England.

Q. Altogether?—*A.* Absolutely if I may say so. The Gold Standard Reserve is maintained in order to meet temporary falls in exchange; that is to say, where the obligations India has to meet cannot be paid except by the export of gold; therefore if you have your reserve outside the country you can pay your creditors outside India what is due to them, from the Reserve. We could not invest the Gold Standard money in India because it would not be of any use whatever for such a purpose.

Mr. C. E. Low.—*Q.* The point could be explained if you tell us what happened between America and England recently?—*A.* What happens when there is a fall in exchange? People want money due from India in England or outside India. If you have your investments here, nobody outside India will take them in discharge of what is due to them.

Q. But what about the Paper Currency Reserve?—*A.* The Paper Currency stands on a different footing.

Q. Do you think you could not invest in India even a portion of the sum which you invest at present in England?—*A.* Honestly with every desire to see industrial enterprise developed in India, I am quite convinced that we could not have the Paper Currency or Gold Standard investments invested in industrial undertakings in this country.

Q. Put aside industrial undertakings and take up the general question of investments in India?—*A.* The issue of those 10 crores which form the Indian portion of the Paper Currency Reserve is Government Paper, *i.e.*, Government creates 10 crores of Government securities and says, "These securities are the backing of 10 crores of our notes." You cannot very well make these 10 crores of securities do double duty, *i.e.*, both to support an edifice of industrial ventures as well as provide the backing to the currency.

Q. You know that this reserve has not to be utilised for a long time; does that not show that you could divert a portion of it to other purposes?—*A.* Oh; no.

President.—That would be equivalent to saying our present reserve is too big.

* Figure for Calcutta Circle only. The figure for the whole of India is Rs32,33,85,789.

Hon'ble Pandit M. M. Malaviya.—Q. So far as the cash balances are concerned, is the present practice the same as is described in Keynes' book on Indian Currency and Finance which was written about 1913, or has there been any change?—A. Mr. Keynes says:—

"The practice has been to keep a certain part of the balance at the bank (of England) and to lend the remainder at interest. The usual method is to lend to certain banks, discount houses and stock brokers of high standing, whose names are included in an approved list containing 62 names. The list is revised periodically and applications for admission carefully considered with reference to the standing and resources of the applicants and the nature of their business. Loans to borrowers on the approved list are granted as a rule for periods from 3 to 5 weeks, so that the whole balance could, if needed, be called in within six weeks."

Q. Is that the practice even now?—A. That is the Secretary of State's cash balance?

Q. I am referring to the Secretary of State's cash balance?—A. And treasury balances in England?

Q. Yes. Is that the practice which prevails even now?—A. He has a certain amount out at short notice. I think that particular point was taken into consideration in the Chamberlain Commission, and certain recommendations were put forward. I don't know exactly, but I take it that his cash balance is nothing like what it used to be. You are referring to the time when his balances were very high, but they have been reduced very considerably. I don't think he has much out.

Q. Apart from the amount, what I wanted to know was, has there been any change in the practice?—A. I don't know what the practice is at the present moment, whether he is following that list he had before. I would rather say that I don't know what it is at the present moment.

Q. Your duties are to watch the operations of the Currency Department and movement of funds, and the resource operations of the Government of India?—A. Yes, that is the description of the Annual Report issued by the Controller of Currency.

Q. Does that not fully describe the nature of your duties?—A. Yes, it is practically complete but it is not entirely complete.

Q. Then it is part of your business to know whether there has been any change in the system in the matter of the cash balance of the Secretary of State?—A. Yes, it is my business to know, but I cannot tell you whether that list has been reduced or added to.

Q. I did not ask if the list had been reduced or added to; I want to know if there has been any substantial departure from the practice described by Mr. Keynes?—A. None.

Q. Is the money lent out sometimes at 2 per cent. and sometimes at even less?—A. By the Secretary of State? I cannot tell you; that is not my business.

Q. You are not aware that it has been so lent in the past?—A. Not officially, but I understand that in 1913 when money was very cheap, the Secretary of State lent at that rate.

Q. Are you aware that the Secretary of State lent money at 2 per cent. and had to borrow at 2½ per cent. from the very same firms to whom he had lent at 2 per cent?—A. Not from those very firms; I am not aware of that.

Q. Don't you think that if the Secretary of State's balances, and generally the reserves of the Government were available in larger measure in India, they could help industries both commercially and industrially better; they could feed Indian industries better?—A. The balances in India are worked to a very low minimum, just enough to keep the operations of the Government of India going, excepting during the time when we get the proceeds of our annual Rupee loans.

Q. You have said that the creation of new banking agencies, in order to give assistance to industrial undertakings, is a pressing problem. Do you not think that if Government put a fair amount of its own reserves in these industrial banks, and organised them in a proper way, that that would give a great impetus to industries in India?—A. Yes, if one could make available these resources as you suggest. The result would be, as you indicate, but the reserves of the Government of India are, as I have said just now, never sufficiently large to embark on any very large policy of this kind. I am referring to the reserves held in India.

Q. Even so, bearing in mind the extent to which the Government helps Presidency Banks, you don't think that Government could help industrial banks or banks supervised by the State, even to the extent to which it helps Presidency Banks?—A. I should find it extremely difficult to work the balances of the Government of India with any further call on them.

Q. Then until a part of the reserves held in London—the Paper Currency and the Gold Standard Reserves—are made available in India, in your opinion Government could not help industrial banks?—A. I don't think those reserves can be made available in India.

Q. Whether they can or cannot be is another question?—*President.*—A. Everything depends on that question, otherwise it becomes a hypothetical question.

Q. I am looking forward to the possibility of part of those reserves being held in India?—A. My point is that I can only reply to the hypothetical question like this. If those balances

were made available in India for investment as you propose, I do not think there would be any system to talk about.

Q. At page 60 of the Report of your Department for 1914-15, it is stated, "The Gold Reserve is held in the following securities :—

	Face value.
	£
British Government 2½ per cent. Consolidated stock	3,266,392
Local Loans, 3 per cent. stock	200,000
Guaranteed 2½ per cent. stock	438,720
Transvaal Government 3 per cent. Guaranteed stock	1,092,023
Exchequer 2½ per cent. Bonds	16,000
Exchequer 3 per cent. Bonds	6,885,600
Canada 3½ Per cent. Bonds	161,000
Corporation of London 3½ per cent. Debentures	45,000
New South Wales 3½ Per cent stock	113,000
New South Wales Treasury Bills	750,000
New Zealand 3½ per cent. Debentures	45,000
Queensland 4 per cent. Bonds	155,000
Queensland 4 per cent. stock	55,000
Southern Nigeria 4 per cent. Bonds	350,000"

Is it conceivable to your mind that instead of investing to this extent in foreign Governments, the Government of India may begin to invest a portion of the reserves in India?—
A. Not for the Gold Standard Reserve.

Q. Why?—A. Because the Gold Standard Reserve is intended to provide gold in England to meet the fall in exchange.

Q. Only to meet the fall in exchange?—A. Yes. When the war broke out eight million pounds had to be paid in gold from India.

Q. So that, until the Government adopts a gold standard for India, you think there is no hope of benefiting Indian industries by any portion of this?—A. I don't know what you mean by adopting a gold standard. We have a gold standard.

Q. I mean making gold the standard currency?—A. Demonetise the rupee?

Q. The rupee is already demonetised; adopting the gold coins as the standard currency?—
A. The gold coin is already current here.

Q. Exchange does not go every year against India now, does it?—A. At the present moment it is in favour of India. At the time I was engaged on the wheat scheme it went against India; that was in June-July-August 1915.

Q. Can you say how many times in the last 16 years exchange has gone against India?—
A. In 1907 it went badly. We had to send home eight or ten millions. Last year we had to send three millions. These are the striking cases. There have been other times when the knowledge that Government would come to the support of exchange helped to avoid a fall.

Q. Considering that it has happened so few times, you don't seriously contend that it is necessary to maintain the gold standard reserve where it is maintained, in order to meet the exchange difficulty?—A. Yes, I do most certainly.

Q. How many other occasions do you remember during these 16 years when exchange has gone down?—A. Do you mean actually falling below one and four pence? Many times. I could not tell you off-hand. Your general experience will suggest the answer to you. There have been many times when the rupee has been worth less than one and four pence.

Q. Has it been frequent, or has it been rare?—A. The number of times the rupee has been worth less than one and four pence is probably more numerous than the number of times it has been worth more but I would not like to say straight off.

Q. Are you aware that the Indian Specie Bank applied to the Government for a loan and was refused?—A. I am not officially aware of it. I was not holding my present appointment at the time but was in Bombay and heard something about it.

Q. That it had applied and was refused?—A. I was told that it had been refused.

Q. Are you also aware that silver was not purchased through the Indian Specie Bank, though its offer was less than what it was purchased for?—A. There again I don't remember

I have not seen any official paper in which Chuni Lal of the Indian Specie Bank offered Government silver. My information at the time was not acquired in the course of any official duties; it is just information acquired by talking to people. I understood that he was cornering silver.

I find it stated in this publication of the "Times of India" called the "Indian Currency and Finance" as follows :—

"The fact appears to be that the management of the currency has degenerated into operations to annihilate the Indian group of speculators and it would appear that the great resources of Government are being made available to that end. It is not enough to starve the group as, according to Messrs. Montague, they have lately been starved. Other means as we have seen have been employed to circumvent them, and it is impossible to say whether further irregular measures may not be contemplated. Has this not been carried too far? Even if the Indian speculators were out of the market would Government be any better off? Government would still be at the mercy of speculators as they were before the Indian clique entered the market * * * In any case it is unseemly for a great Government to allow their resources to be employed to circumvent one set of speculators only that others may gain," etc.

It is further stated there :—

"When the Indian public have been put to the expense of providing immense sums of money to enable Government to do without fresh purchases only to find that purchases have been made at much higher prices than could have been obtained if no delay had taken place in making the purchases, it is of little use to ask the public to believe that any advantage in price has been gained by the transactions now announced."

Q. You see my point. I am putting it as a matter bearing on the banking problem?—
A. If I may say so, the purchase of silver from Chuni Lal has nothing to do with the banking problem.

Q. In one sense; but assume that the Government had purchased from the Indian Specie Bank, is it not likely that the bank would not have come to grief?—A. It is an extremely difficult question for anybody to answer. I am not a hostile witness on this question, but I saw a good deal of what was going on in the Specie Bank, and perhaps some of your colleagues will tell you. I find it extremely difficult to answer that question.

Q. As far as you are aware, did the Government purchase the silver at a higher rate than the rate at which they could have got it from the Indian Specie Bank?—A. I don't know what rate the Specie Bank were prepared to sell it for.

Witness here gave confidential evidence.

President.—Q. If you did guarantee interest, would you not be forced correspondingly to raise your reserves?—A. I don't think necessarily so, because we would then definitely, ascertain our liabilities in the course of the year and would budget for them accordingly, and these would be distributed over the whole period of the year, and we could arrange for payment coming at a time when our balances are able to afford it.

Hon'ble Pandit M. M. Malaviya.—Q. In case of deposits, would you recommend that deposits should be received in banks requiring them but not for a short time?—A. Industrial banks should not receive deposits at call nor at short notice.

Q. You would take long term deposits?—A. Yes. *

Q. Or would you prefer the system of issuing bonds, so that they may not be able to make a rush on the bank for payment?—A. I don't follow that.

Q. I mean bonds, share bonds, or debentures?—A. I contemplate this will be a joint stock concern, and whether the capital should be raised in shares or bonds or debentures is really a matter of detail. That is entirely different from the deposit question.

Q. Do you think you will attract long term deposits if Government guaranteed interest?—A. I take it that what would happen would be this. Government can either say, "we will guarantee so much per cent. interest on the capital or we will guarantee a certain rate of interest on the deposits so that your rate for deposits can be higher than those of other banks." Those are two alternatives.

Q. These are somewhat on the lines which obtain in Japan. In Japan the Government have guaranteed interest for 5 years, I think, and that has, I believe, helped to establish such banks?—A. I don't know about the Japanese experiment.

Q. Would you have only one bank for the whole country, with branches in different places, or have provincial industrial banks in different provinces?—A. My personal feeling in regard to banking is that the local banking system is the best. I don't much favour an All-India Bank. I think local conditions vary such a lot, and particularly in the case of industrial banks where success is dependent on the local manager's knowledge of particular people, it seems to me essential that there should not be an Imperial or All-India Bank.

Q. You say in regard to the question of Government purchase of products that "I believe that there has always been a feeling in respect of these latter rules that they unduly favour purchase through the India Office." Is it not one disadvantage of this system that Indian manufacturers receive less consideration than they should?—A. As I said, in answer to

Mr. Low, I believe they are handicapped; the rule operates in such a way that they are handicapped.

Q. For instance, take the railways. Purchases are made for railways for which there is absolutely no justification, and which are entirely against the spirit of the rules laid down by Government to encourage indigenous products. You are aware that Government has laid down that where you can buy indigenous products, you must give them preference. Now take for instance the Tata Works; because the purchases are made through the Secretary of State, the Tata Steel Works cannot get the full benefit of the rules by reason of their articles being produced in this country?—*A.* I don't know about the particular instance you refer to, but while on the Stores Committee I did come across a case similar to that where an Agent of a Railway was ordered by his Home Board to refuse to give evidence before us on the ground that the Government rules were only applicable to their purchase of stores by the courtesy of their Directors. I think, generally speaking, your view is correct. I think the point has been put sufficiently correctly as I have put it in my note.

Q. Have you any suggestion to make to ensure that full effect may be given to the rules laid down by the Government of India?—*A.* I suggest that the form of rules should be amended.

President.—*Q.* The new rules are that if you can get the stuff in this country you do not buy from home?—*A.* That is only applicable to certain articles. The rules were very skilfully amended, so that with regard to certain classes of goods you had to go home. You could only buy in this country if you could buy as cheap and as effectively as if you bought at home. I think I am right in saying that the Department of Commerce and Industry review all these purchases at the end of the year, and ascertain why the rules for local purchase have not been carried out. I think if you had a department which could save the purchaser the trouble and responsibility incidental to the purchase of locally produced articles no doubt there would be considerable improvement in this respect.

Hon'ble Pandit M. M. Malaviya.—On of the witnesses said that firms would not bring this to the notice of the Department of Commerce and Industry, because they would be afraid of offending the Public Works Department with whom they have to deal. The policy laid down by Government is quite clear; they say you must purchase things produced in the country, and there will be no excuse for purchasing goods outside the country, so long as the indigenous articles are fairly good, and the price is not unfavourable. Yet you find the rule is violated over and over again by the person who is supposed to enforce it, namely, the Secretary of State.

President.—*Q.* Don't you think that the trouble is due to the fact that we have got the India Stores Department where orders on a large scale are accumulated, and where they receive orders year by year in sufficient quantities to enable them to make forward contracts; and that until we have a corresponding department in this country, we are bound to be handicapped?—*A.* Yes.

Q. Don't you think from what you know and what you have heard in a reliable way that it is possible that firms are handicapped here by the fact that individual officers can buy under these rules and that they don't want to offend these individual officers?—*A.* I think so.

Q. You are also of the opinion that Indian officers are afraid to undertake the responsibility of buying locally?—*A.* Yes.

Hon'ble Pandit M. M. Malaviya.—*Q.* You say, speaking about trade representatives in London, that "a far more important requirement is to provide manufacturers or capitalists who are interested or likely to be interested in the purchase of, or the development of, Indian products with the facilities of ascertaining the preliminary data without which their operations cannot be begun or extended". In concluding that paragraph you say "We need to introduce some suitable method of attracting attention to these resources, and to the very complete data which many Indian scientific departments have put together as to the possibility of commercially exploiting these resources." Do you think that the Government of India, as a Government, should encourage the exploitation of Indian resources by foreign capitalists?—*A.* I think anything is good which brings capital to this country.

Q. Should it not be the object of Government to encourage Indian capitalists more than they have been encouraged?—*A.* I think Indian capital should be encouraged. My feeling is that India and the Indians are in the position of that of a young man who has come into an enormous property which is undeveloped, and which he cannot develop with the monies which he has inherited. It would be a sorry policy if he was to say that I will not let people develop this portion of my property until I have developed the rest.

Q. On the other hand you will take care that he gets a fair share of the profits of the inheritance he has received?—*A.* I entirely agree.

Q. If you have a trade representative who is to supply information to capitalists in London, or to those who wish to exploit Indian resources, these capitalists with their better organisation, more scientific knowledge, and more capital, would be better able to take advantage of those conditions than Indians would be?—*A.* I think there is room for both, and I am a great believer

in competition for the purpose of stimulating. I don't believe in preserving for a man, who can develop only one corner of the field, the whole of it.

Q. Would you make your proposal so catholic as to include non-British subjects, say Americans or Japanese?—A. I have heard it suggested that we should adopt a tariff which would differentiate between nations according to the degree of neutrality, hostility and assistance displayed by them during the war. I would like to think over such an idea.

When you find the young man you have been speaking of, would you as his guardian, let out his property on a long lease?—A. Oh, no.

Q. And you would see that the young man—your ward—is properly trained to take advantage of the resources which he has inherited?—A. He ought to train himself.

President.—And be beaten if necessary.

Sir D. J. Tata.—He has got to get some of those hard knocks.

Hon'ble Pandit M. M. Malaviya.—Q. Do you think that the capitalists you have in mind have been trained entirely by themselves, without assistance from the State? Let us take an instance. Take the steel trade in America. You know that before the sixties there was no steel trade there worth speaking of. From the sixties onwards they have now established a steel trade which is by no means despicable. That was done by the help of the Government. Don't you think that the young man whom the Government is in charge of should be helped both by knowledge and assistance, and a proper regard for his interests in the resources of the country?—A. I agree that he should be assisted to the extent that he assists himself.

Q. I quite recognise that indigenous capital is shy at present. But it ought to be encouraged. I think there is danger in the proposal you have made that the interests of English capitalists may be promoted at the expense of the legitimate interests of the Indian subjects of His Majesty?—A. I think you have got to take it this way. You have got to either see a property quickly and efficiently developed, or you see it slowly and perhaps not as efficiently developed. I am not in the least afraid of British capital coming to this country, because I think there is room for it.

Q. It is not a question of British capital coming or not coming; the whole question is that of safe-guarding the interests of Indians?—A. I think there is no reason to fear that they will be damaged seriously or at all. It is only a question of administration.

Q. I will give you my reasons for my misgivings, and would like you to solve them. Take this Copper Syndicate at Singbhum. I don't know who the members or the shareholders of the Syndicate are; but suppose there is a trade representative in England, and suppose he gets information about the possibility of developing copper in that particular district, and the English capitalist comes and develops it entirely with British capital, not offering it to Indians or inviting Indian capital at all. How would you guard against this; what measures would you take to secure that Indians should have a fair share in the development of their country?—A. He has a corresponding department in India who would do the same thing for him as the trade representative is doing for British capital, viz., the Survey, Forest or Industry Department.

Q. How will you ensure that there shall be fair play—absolutely fair play—between Indian and non-Indian subjects of His Majesty?—A. In the first place the fact is that the information which the trade representative will possess will be information collected in India; therefore the distance alone would give the Indian capitalist the earlier chance of working on that information; secondly, the departments concerned are departments located in India. They ought to be—and many of them are—constantly in touch with Indian capitalists.

President.—Q. In the particular case you mention, the information was published here in the records of the Geological Survey in 1904, and again in 1908 when the boring results were obtained; so that the information was published here before it was published at home; in fact during that time there was no trade representative to push it. Of course the Geological Survey was at the disposal of anybody who wished to come?—A. I think the position is that all of us, who know anything of India, are more anxious to see it developed by Indian capital than by anybody else; but we don't want to see such development fail because Indian capital won't come forward. I also think after the war India will be certain to get a certain amount of capital from other countries, and if you say we must not use this capital, I don't see it is much advantage that we should have, as a result of the war, altered for the time being our position from being a debtor to a creditor country.

Hon'ble Pandit M. M. Malaviya.—Q. I am not blind to the advantages of English capital being invested here, and there are other obvious reasons why we should welcome it; but in view of the industrial backwardness of the Indian people, do you think that it will be a fair proposition to suggest that every company that is established in India should offer half its capital to be subscribed by Indians?—A. May I suggest that the present tendency in most enterprises is to have a rupee capital, because of the pitch of taxation at home. There will be a tendency to raise money in this country or to bring money into this country. I don't think you need be alarmed.

Q. Do you think that a proposal like what I have suggested would operate to draw out Indian capital, because the European would bring expert advice, and his co-operation would

be secured, and Indian capital would come forward all the more readily, because there would also be this feeling that Indians were sharing in the enterprise?—A. If you were to make that limitation that they must raise half the capital, supposing they don't get half their capital?

Q. Fix a reasonable time, lay down reasonable conditions which would give Indians a fair opportunity to subscribe?—A. I am very doubtful about these artificial methods.

Q. I have been led to think of this proposal because I have learned in the course of my tour that some companies would not offer any of their shares to Indians, or would not record transfers of shares in favour of Indians in their concerns?—A. On that point I am very doubtful whether an artificial division in all cases as between India and England of the capital which has to be offered is a practical proposition.

Sir F. H. Stewart.—Q. Could you give us any general opinion about the comparative suitability of methods 3, 4 and 6 of giving Government aid to existing or new industries, in question 5?—A. 3, 4 and 6 are only different forms of the same idea, except that in method 4 loans without interest are contemplated. Such a method would be the same as 1 and 2, except that it implies repayment.

Q. You would say that the loans should certainly bear interest?—A. Yes. I would rather put the matter in the form that I have put it in my note.

Q. I was trying to find out if, in your opinion, one method was preferable to another?—A. I have thought a lot over that and my view is that, from the point of view of administration, it is always better not to lay down a very precise formula, because it grows into a rule and hampers any case which cannot be met on the ordinary lines. What I feel is that there is at present no definite policy in regard to this question of Government assistance. I think the guarantee of purchase the most suitable form in a number of cases, but you could not, if you had a pottery factory, guarantee that Government would buy so much of the supply, or if it were a case of developing a dairy Government could not very well undertake to purchase so many quarts of milk every year.

Q. Who would decide when and how assistance was to be given to the industry?—A. The Industrial Department, who would advise the Government of India.

Q. Would that department be Imperial or Provincial?—A. I do not believe in decentralisation when you are discussing scientific departments. You want an Imperial department who would lend assistance to provincial enterprises. You could not afford to duplicate the scientific staff.

Q. You would not have a provincial department also?—A. I am not very much in favour of Provincial Departments.

Q. Would not the circumstances of the different industries requiring and asking for assistance be better known?—A. The case is different from that of an All-Indian Industrial Bank. A bank manager must know the people who come to him. You could not, if you had an Imperial bank in Calcutta, and an application came from Cawnpore, expect the man in Calcutta to know sufficiently about the Cawnpore applicant. You would have to get local knowledge; whereas in the case of an Imperial Industrial Department, dealing with industrial questions, it is perfectly possible for the head of the Industrial Department to go down to the province and put one of his experts on to work it up. Unless you are prepared to duplicate the whole staff right through, I don't see how you are going to make it effective, and after all, the supply of experts is limited. We have got 11 Local Governments and administrations, and we cannot have 11 chemists, 11 geological departments, 11 tanning experts, etc.

Q. With reference to your answer to question 10, you consider that there is need for Government to take the initiative in providing these banking agencies. Don't you think they will come of themselves?—A. I don't think that Government should collect half a dozen capitalists together and say, "You are to form an industrial bank." I think if half a dozen capitalists came together to form an industrial bank and went to the Government for assistance, I would not object to the Government being prepared to consider a proposal to assist if a satisfactory scheme could be formed.

Q. Supposing the Government wanted a considerable sum of money for the purpose of aiding industries, that would have to be derived either from taxation or from loans?—A. Yes.

Q. Do you think that the proposal to raise a loan for this purpose would appeal to investors?—A. Personally, on principle, I am doubtful as to the advisability of Government raising a special loan (as apart from its general borrowings), for a particular specific local purpose. It seems to me the whole of the assets and credit of Government is at the back of any loan, and you cannot say, we are going to regard this portion of the general assets and credit is at the backing of a loan raised for one, and another portion thereof at the backing of another, particular loan. I think one way is to increase the amount of borrowings which we make in this country. The tendency has been to rely more on Indian capital than on home capital.

Hon'ble Pandit M. M. Malaviya.—Q. For instance, as you have done in the financing of the buildings at Delhi?—A. That is one instance of it.

Sir F. H. Stewart.—Q. With reference to your evidence about the Indian Trade Commissioner, are you considering that he must always be an official or an ex-official?—A. I said

"if an official." My view is, take the very best man you can get, whether he is official or non-official; a man of the Civil Service or any other service or department.

Q. What term of office would you indicate to prevent his getting out of touch on the one hand, and to prevent too many changes on the other?—A. I think possibly a tenure of 5 to 7 years, with the arrangement for periodical visit to this country in the interval. I think he should arrange to come out here from time to time.

Q. Don't you think that you might starve on small lines, and that it would be difficult to expand later. You might have difficulty to get the Government of India to consider increases afterwards?—A. I have never found the Government of India unreasonable, when a satisfactory proposal comes to them properly prepared and backed by detailed inquiry of a competent person. I don't fear the contingency you contemplate.

Q. With reference to the Director-General of Commercial Intelligence, I gather that even if you have got your Industrial Department, you still think there would be a distinct need for this officer?—A. Oh yes, most certainly.

Q. For the reasons which you give?—A. Yes.

Q. Where would you put him?—A. I have no doubt whatever that he must be in Calcutta. He will have to be supported in Bombay, but the headquarters should be in Calcutta.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. About Government help to industries, what industries should Government help, coal mines or jute mills or other big concerns like that. Will twenty or thirty lakhs be sufficient?—A. On this point my view is that you should attack the really big ones. I think that the resources which Government has for purposes of helping industries are naturally not unlimited, i.e., they are limited, therefore you ought not to dissipate such strength as you have got in attacking small problems which do not spread further. You want something big on which other industries will hang, for instance, heavy chemical industries, and the aluminium industry.

Q. You think that these should be supported by Government, or should Government pioneer such industries?—A. They ought to see it through in any case, but if they can get capitalists to come in with them, on the basis of a share in the risk or of a guarantee of interest, so much the better. You should concentrate your powers on the big things.

Q. And about the smaller industries, the cottage industries?—A. These don't appeal to me. I think the system of loans on takavi lines might be developed.

Q. You think that Government guaranteeing the interest is more preferable to their giving the money?—A. I think on the whole it is probably better.

Q. About the Indian trade representative, I suppose you are aware that feeling on Bombay side is very keen that Indian Attachés ought to be at every Consulate to have Indian trade encouraged. Don't you think that Indian industrial products can be pushed if there are Indian Attachés at different Consulates?—A. I don't know. The British Consular Service has not been very successful from the point of view of assistance to trade.

Q. As you know, the Japanese Consular Service has been very effective in Bombay?—A. They, I think, are called by some other name.

Q. About industrial banks and your scheme; do you think that the Government should guarantee some interest on the capital?—A. I think that is one way.

Q. Don't you think that capital would be forthcoming if Government guaranteed a reasonable rate of interest?—A. I hope so.

Q. What rate of interest would tempt the capitalist; can you tell us?—A. The competition at the present time of other industries is so severe that any remarks one would make at the present time would be inapplicable to other conditions. I should say a little more than that the rate at which Government loans are floated.

Q. About these museums; it was suggested to us by some of the witnesses that as most of the manufactured articles from Indian raw material samples of the imported foreign articles exhibited that would be a great advantage; people would see them and try to initiate their manufacture locally?—A. As an educative arrangement, that probably has its points. But I don't see any value in it commercially. I don't see that the sight of a bale of cotton or piecegoods would tempt anybody to put money into the business.

Q. But how would you think of this proposition commercially?—A. Not as a commercial proposition.

Q. Then you want an Imperial Department of Industries?—A. Yes, I should like to see that.

Q. And you want the Provincial Director of Industries too?—A. I am not very keen on Provincial Directors of Industries, except that you want somebody with local knowledge to sift the information that would come from different parts of a province. Personally I feel that the experts should be Imperial. There must be an Imperial Director, who would be able to place the assistance of his experts at the disposal temporarily of the local people.

Q. Can I suggest a hypothetical scheme that I am thinking of? Suppose you have an Imperial Department of Industries, with all the experts Imperial, and then suppose there is a Board of Industries in every province consisting of local business men, some nominated by Government and some by the local bodies, with a Director of Industries, and that they have the help of the experts, and suppose an industry proves successful; and the Government of India think that in a particular province it can be much better helped by Government than if financed by the industrial bank, don't you think that in that way the industries can be encouraged?—A. I attach very little importance to a constituted Board of Advisers, because I believe—and my own experience has been—that advice is more often asked by non-officials when there is no definite relation. Where there is a definite relation it immediately sets up points of difficulty. A provincial Director of Industries would have absolutely no difficulty in getting hold of the leading men of his place if he was competent.

Q. Do you know anything of the Indigenous Committee we have in Bombay?—A. I know very little about them. I talked to your Secretary in Bombay when I was down there recently, and have had communications from him about it, but I am not enamoured of that sort of organisation. The best information is obtained by talking informally and without a regular set of meeting hours, and where a lot of administrative routine comes up to be discussed, instead of propositions of particular moment.

Q. In the Imperial department you don't want an Advisory Board?—A. No, I am not in favour of that.

Q. And about the Director of Industries, do you think he ought to be a service man or a business man?—A. The Director of Industries should be the very best man that you can get.

Q. And should the local Director be recruited from the Imperial Service?—A. If you have a local Director, you must also pick your best man.

Q. And he must be under the Imperial department and not under the Local Government?—A. Provincial Directors will be provincial officers.

Q. His recommendations also will go to the Government of India?—A. I take it that his position would be exactly the same as the Director of Agriculture. He would deal with problems, that came up in the province and if he wanted assistance, he would ask the Imperial Department for the assistance of experts.

Q. What about the industries in the meanwhile? It will take two or three years before the Government of India's reply can come. It will go into somebody else's hands. It is the delay that I am afraid of. Don't you think if the department was local it would be better. If there is a local Director, he will send to his Local Government; he will see the industrial people get their advice and send to the Government of India, who will think over it?—A. Then eliminate the local directors altogether. You have got your Imperial department with the experts and can go direct to the Imperial department.

(The Commission adjourned at this point and resumed after an interval.)

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. If the industrial bank could lend on machines and the buildings and other things, don't you think that Government can do away with the direct help to industries if they help through this bank?—A. I am a little doubtful whether the industrial banks could be developed very fully on that basis.

Q. Then supposing that Government gives some concessions or guarantees interest, don't you think that at the time the prospectus is issued they should lay down that half the capital should be subscribed by the Indians. Indians will be able to start big industries if English firms do not come in, and that will be beneficial to the country?—A. I do not contemplate we should give any special concession to British capital coming into this country.

Q. If Government is going to take up this chemical industry it must guarantee interest for a certain period or give some other concession. Then don't you think that the Government ought to compel that nearly half the capital must be offered to Indians when they issue the prospectus?—A. Do you mean then that I should be debarred?

Q. I am thinking of the inhabitants of the country?—A. Supposing an Indian subscribed to the capital at the start and subsequently proceeded to sell his share?

Q. Supposing a syndicate is formed in England and they take up the whole of the capital then India has not the advantage?—A. I cannot see how you are going to make the shares attractive if you attach that particular disability.

Q. The other shareholders also will sell it?—A. Why is any differentiation necessary? I cannot conceive that the raising of capital will be easy if you attach disability of this kind.

Q. About these Swadeshi stores do you think that Government ought also to have these like the museums?—A. I should like to see some sort of organisation where Government would provide the means of putting before a would-be-purchaser the products of certain manufacturers leaving him to make his own arrangements with the manufacturer he selects.

Q. Supposing some department of Government here published a list of the articles every year, that are purchased at home with their different prices, would it not help the local

manufacturers here to know what goods they can supply?—A. I think there is a good deal in that. That was one of the recommendations of the Stores Committee.

Dr. E. Hopkinson.—Q. With regard to Government assistance to industries I understand that you have in mind three quite distinct forms of undertakings to which the Government might give financial aid. You have already explained in answer to one of the members that in answering question 4, paragraph 1, you had in mind large industries involving large capital sums and you quoted instances of the chemical industry and aluminium industry. That makes one distinct compartment. In your paragraph 2 you deal with another matter. You speak of small individual industrialists who do not appeal to the public for subscriptions but who want financial aid. You speak of the model of the system by which Government places loans at the disposal of the agriculturists. I do not know exactly what model you are referring to?—A. There are two classes of cases. My experience dates back in this connection to 1901, but my recollection is that there were two classes of cases in which Government assisted. They lent money out at 6½ per cent. for the purpose of assisting cultivators to purchase seed and there is another class of cases where the money is given for the purchase of agricultural plant. These advances are recoverable by the District officer. In my own experience I have given considerable sums, just after a famine to re-establish agriculturists who had suffered from the famine. In another district in which I served we made advances for the digging of wells. We fixed the time of repayment according to the time when the well would be finished and the man could bring the land under cultivation. We had never any difficulty in recovering the loans.

Q. Who provided the loans?—A. The Government of India places at the disposal of the Local Government a certain sum of money every year.

Q. The funds are provided by the Government of India whereas the loans are given through the Local Governments?—A. Yes. The advances are made by the District officer on the spot. I remember in one district having at my disposal a sum of Rs30,000 to distribute to agriculturists in this way. They generally gave security in the form of personal security I cannot remember whether other security was generally required.

Mr. C. E. Low.—Q. In many provinces we give out agricultural loans for seed and cattle on the joint answerable responsibility of all the people in the village who take loans. I understand that you recommend that the system as it exists should be continued, that it is useful and that so far as it goes it is useful and you consider it should be continued?—A. Undoubtedly it must continue and I would like to see it applied if necessary to the small industrialist.

Dr. E. Hopkinson.—Q. I want now to ask you as to the third category of undertakings to which Government financial aid should be given. In answering question 10 you suggest the assistance in these cases should be through new banking agencies. What sort of enterprises do you think such industrial banks should assist?—A. I am thinking of an industrial concern which is half way between the very big ones and which cannot be called minor industries. For instance the pottery industry. I understand that assistance is required from Government. It is not big enough to go into the first category and it is too big to come under the second.

Q. That is sufficient to indicate what you have in mind. Returning to the big industries, you suggest that the Government should not take the whole of the risk. I understand from that that you want Government to take some portion of the risk. Before financial aid to any industry is considered the first business of Government is to ascertain that the proposition is financially sound?—A. Quite so.

Q. And if the risk is a material one the Government would not deal with it at all?—A. There is a certain amount of risk in the early years of the operations of an adventure of that kind. For example the output may not come to a certain desired standard.

Q. The risk should be ascertained beforehand, so far as human foresight can and if a venture can be described as risky the Government ought to hold aloof?—A. If it is to be labelled as a risky one I agree with you that the Government should not undertake it. My view was rather that in the initial stages all ventures are more or less in the manner of experiments.

Q. That I grant. But you admit that risk as far as possible should be eliminated?—A. I entirely agree with you there.

Q. From the way in which you have worded your answer I think your idea is that the object of Government assistance is to take some part of the risk. Now as far as I can see that is not what is wanted. It is not the question of risk. It is the question of finding the actual money to start the undertaking in such large matters as we are speaking of. It is the question of obtaining the necessary capital. Is that a correct view?—A. I think that if you are going to break new ground surely there is a certain amount of uncertainty attached. One might take the example of the iron and steel venture in regard to which at the time it was started there existed a certain amount of risk as to whether the output would be of the quality required.

Q. Take as an example the question of growing long staple cotton. Now I assume that the scientific departments of Government have shown it can be grown successfully. But that is a small part of the matter. There are other considerations. It must be grown within a

limited irrigated area with proper arrangements for ginning and marketing all of which require much capital. It may not be so attractive financially as the steel proposition. But is not that the sort of thing that Government ought to assist. I only give that as a casually chosen example of what I mean. It indicates the sort of thing I have in mind?—A. I did not quite contemplate a case of that kind. That particular instance is one which Government has already had to consider and has passed on the inquiries to the Agricultural department. I do not know very precisely what they do at Pusa. I understand that they conduct experiments in the improvement of crops and they demonstrate the value of their experiments by actual trial on the spot and then they get the people interested (either the cotton mill owner or the exporter) to put the trial sample on to the market. I thought that that kind of case would be sufficiently provided for by the methods now in existence in the Agricultural department. I was rather thinking of the class of cases which are not embraced by the Agricultural Department. I think my definitions do not cover the whole ground. I entirely agree that there is a hiatus between all the necessities of the country and my suggestions for meeting them. I have never contemplated the agricultural side of the thing for one thing. There is a difference between the agricultural and industrial problems because the risk in the two cases is of quite different character.

Q. Do you agree with me to some extent at least that it is not a question of taking risk but of finding the capital?—A. That is undoubtedly the whole trouble, the provision of capital.

Q. Does it not follow from that as a necessary deduction that capital should be provided in a form that is best secured, say, in the form of debentures?—A. I agree with that as a general proposition.

Q. And not in the form of shares?—A. Not in the form of shares.

Q. For two reasons; first in order to minimise as far as possible the risk undertaken by Government and secondly because Government can always find money more cheaply than any other agency. So that you would add that Government assistance to large undertakings should as far as possible be in a form of loans secured either by debenture or otherwise, so as to diminish as far as possible any risk to Government?—A. Yes.

Q. Now further in connection with this matter will you tell us whether your paragraph 3 in answer to question 4 as to management and Government Directors refers to large undertakings or only to the smaller industries?—A. That was in direct reply to one of the questions as to how Government control was to be provided in cases where Government gives financial assistance. My objection to the suggestion that there should be a Government director with well defined powers simply arose from the fact that the Government director cannot be in more than one place at a time; it would be impossible for the director to move about attending these small meetings.

Q. If there is a Director of Industries in a particular province why should he not be the director of the company?—A. I did not contemplate there should be a provincial Director of Industries. I contemplated that there should be an Imperial department.

Q. You do not contemplate a Director of Industries in each province?—A. I personally prefer to see an Imperial department which would deal with all questions coming up from the provinces and which would send an expert down to enquire into cases. There are as many as 11 provinces and I feel doubtful whether we would be able to get 11 competent men who could be of use in dealing with questions arising in connection with these companies. I should be very doubtful about that.

Q. You suggest that in place of the Government director the minutes of the directors should be subject to Government approval?—A. Government should have access to the minutes. They will have to keep a close control. They will have to watch the proceedings.

Q. Is that a feasible arrangement? Can the affairs of any company be properly directed, if the decisions of the directors are to be sent to Government for approval or disapproval before being acted upon?—A. The proceedings of the directors should be open to inspection. There will be no point in having access to them if you have no right to disapprove of them. That is undoubtedly what I suggest.

Q. And you still maintain it? From my experience in these matters I should say it is impossible in practice.—A. Your experience in these matters carries greater weight than mine. I am probably arguing from the limited cases in this country.

Q. Do you not think that you want to be able to guide the policy from the very start and that the only way to do so is to have a Government director who will be able to have an eye on the policy at its initiation and not when it has been more or less developed?—A. I thought that the Government Director might be more hampering than useful. The Government official, I take it, would always rely on his powers and assume a rather different position to his co-directors and the tendency might then be if he was a man of forceful personality that he might run the whole thing and impose his personality on the other directors.

Q. Would that not be a good thing if he was a man of forceful personality?—A. I do not see much value in making the whole thing a Government show.

Q. Perhaps it might have an educational value upon the other directors?—A. You are more confident of the possibility of finding suitable directors from among Government officials than I am.

Sir F. H. Stewart.—Q. Where would this Imperial Director of Industries be, in Delhi or Simla?—A. I contemplate his being in Calcutta. I contemplate a case which I myself come into daily touch with. The Controller of Currency is not a Director on the Presidency Bank but he is in daily touch with what is going on and with what the bank is doing and the lack of any definite relationships makes for greater confidence between the Government officer and the non-Government bank official.

Dr. E. Hopkinson.—Q. Let me ask you now as to the third form of Government assistance. It is said that the existing banks provide all that is necessary for conducting the commerce of India. That is admitted, but you say that the creation of new banking agencies to give assistance to industrial undertakings is a pressing problem. Do you speak from personal experience?—A. I speak from the number of cases which often pass through one's hands of small concerns coming up for Government assistance, sums which are not sufficient or big enough to attract the well known capitalists. Such cases, as I am referring to, are sufficiently frequent to justify the remark that the problem is a pressing one.

My experience of Indian industries is admittedly limited but I have listened for six weeks to the evidence and I have not heard a single case made out which indicated that a definite system of industrial banks seemed desirable or necessary. That is the impression made upon me so far?—I was thinking of the match factories for example.

Q. That we have heard of and I think the evidence shows that the match factory has no business to exist in India at all under present conditions, and that Government assistance there would have been a retrograde step. I understand you to say that in the course of your official experience you have had many cases where Government assistance would have been of use?—A. There are cases in which Government has been applied to for small sums which indicate that there is a demand for an agency or a bank which should supply capital for such cases. I offer no opinion as to whether assistance would have been effective or not because the cases came up usually unexamined, without the presentation of the salient facts on which an opinion could be passed and it seemed to me that the transfer to an agency of the duties which are at present thrown on the Government departments, namely, to examine the proposition would help the deserving cases. It cannot be said that the whole lot of these cases are undeserving and in this way it would teach the people the lines on which the bank would end money.

Q.—Do you think that it is fully appreciated that an industrial bank in India means an entirely different thing with entirely different purposes from an industrial bank in the United Kingdom? Have you read the report of the Farringdon Committee?—A. I have read a summary of the report. I quite agree. I have been told that there was no doubt that German banks would lend money on the strength of an order placed with the German manufacture, say, by a purchaser in England. Money would, on the strength of this order, be placed at the disposal of the manufacturer to enable him to purchase his material. When the goods are shipped, they still were so to speak the property of the bank who could practically dictate to the manufacturer as to the line by which the goods should be shipped and as to how the money recovered from the purchaser should be remitted to Germany. Such a system would become almost a danger in India. That is not the system that I have in view. My experience of English manufacturers is limited to the short time that I was in the Board of Trade and I heard then that the German banks were rather in financial difficulties.

Q. You still think there is need for an industrial bank to finance Indian undertakings?—A. There are three classes of banks in India. You have got the Presidency Banks, the Exchange Banks, and the Indian Banks. The Presidency Banks finance produce down to the port, the Exchange Banks arrange for the finance required to place the goods on the European markets. That is a fairly rough division.

Q. Do not the Exchange Banks also finance imported goods?—A. Imports are financed by the Exchange Banks to a large extent.

Q. So that the Exchange Banks do finance export and import?—A. Yes. There are the banks which are established up country. Many of them lend, or used to lend, on property. There are also of course the shroffs who finance a lot of the external trade. I do not think that any of these financing agencies are prepared to assist anything in which there is a possibility of a long lock up of capital. That is why I feel that there is a hiatus in the financial organisation out here.

Q. It is then up to us to ascertain whether there is really a need for such a bank and whether the existing organisations can be made use of to meet it?—A. The existing organisations are naturally anxious to continue on lines which pay them.

Q. You would not like the Presidency Banks financing small industries?—A. It seems to me that this would curtail the resources of these banks in other directions. We want to supplement the existing organisations and not to divert financial resources from one channel to another. That will not give us more scope.

Q. Assuming then that industrial banks are set up, a witness the other day said the problem was quite simple. He said that all that was required was that the bank should receive deposits from the public on which four per cent. interest would be allowed and which should be guaranteed by Government and that the bank should lend at 6 or 7 or 10 per cent. to the industrial concern. Do you regard that as a sound banking proposition, which Government may properly back?—A. I do not think that is going to solve the problem. I think it is a most complicated problem. The personnel is likely to give a considerable amount of difficulty.

Q. I could not quite clearly understand the answer you gave to Sir Fazulbhoj regarding the raising of capital partially in India and partially in England. Would it not be possible to reserve a certain portion of the capital to Indian undertakings and a certain portion elsewhere?—A. Yes. I understood that it was to be reserved in India for subscription by Indians. You can say that a particular sum should be raised in such an area but you could not say that only a particular class should subscribe to a portion of the capital. You can make a distribution geographically but I do not think you can do anything more.

Q. I understand you to suggest that in addition to the scientific departments there should be a technical department competent to investigate and deal and direct technical undertakings, both to be co-ordinated?—A. Yes.

Q. You say that the constitution of such an Imperial department should be created on the analogy of the Geological Survey or the Forest or the Agricultural department. In what respect should it be analogous?—A. These departments have a staff of economic enquirers attached to them as well as scientific men who would devote themselves to the scientific aspects. It struck me that we should have not only that economic enquiry but also something more than that and that is to make the preliminary examination before the economic aspect can begin to be considered.

Q. Then you are not specially referring to the organisation?—A. No. What I had in view was that the activities should follow the model of those departments.

Q. Would you go further and suggest an organisation like the Geological Survey?—A. The Geological Survey has to my mind this advantage over the Forest and Agriculture departments in that it is an Imperial department and the others are divided between provincial and Imperial. I had rather pinned my faith to the model of the single Imperial department which would place its experts at the disposal of the Local Governments whenever they wanted to enquire into any subject.

Q. Then you want centralisation and you are not in favour of the appointment of a Director of Industries in each province?—A. I am not much in favour of it personally.

Q. If there is no such provincial officer how is a particular thing to be brought before the Imperial department?—A. I should think that there should be no difficulty in bringing the matter to the notice of the Imperial department on the part of people who are interested.

Q. Would a small manufacturer be willing to enter upon what may be a long enquiry and a long discussion with an Imperial department. Would he not prefer to confide his troubles to a local Director of Industries?—A. I think he would, the small man especially.

Q. It would be a distinct advantage to have a local man who would be sympathetic to the people of his own province and who would know at the same time how to bring the matter into proper form?—A. His functions will have to be very limited then.

Q. There are other matters which might come under his direction, such as industrial schools?—A. I do not think there should be any tendency to duplicate in the province the same department as I am contemplating on the Imperial side.

Q. I do not want to suggest that, but I do want to ask whether it is altogether wise to turn down the idea of a Director of Industries in each province?—A. Then it might be considered whether they should not be part of the Imperial department located in the province. But one has also to consider how cases come up for consideration from Local Government. They are often submitted with very scanty materials for a decision and often without full preparation.

Q. You mean that local Governments should send in their proposals to the Imperial Government with the advice of their local directors and that then investigation will be made by the Imperial department?—A. Yes. The question is really one of administration. If there is a provincial director, it seems to me that if he has no proper equipment to deal with a case with success and the case is referred to the Government of India through the Local Government then, if the recommendation is not accepted by the Government of India the Local Government will feel that it has been overruled on the advice of the Imperial department. To my mind that is the difficulty and that is a serious one, and it was to avoid this difficulty that I suggest that there should be an Imperial department whose advice would be available to any Local Government.

President.—*Q.* There is a great deal of work to be done in the smaller provinces and you want to have some man in the provinces to whom the local men could go for information. Would not the provincial Director of Industries be a useful switchboard, that is to say a man to whom enquirers will go and who will send the proposals on to the Imperial department?—*A.* Yes.

Q. He could give the Local Government advice and instructions on matters on which he could do so. Don't you think he would be useful in that way?—*A.* Yes.

Q. Then the question arises, supposing you made this Director of Industries independent of the Government of India is there not a danger of the Director imagining in his ignorance, as he will be ignorant in all except one or two subjects, that he will be able to follow up all subjects himself and even do research work and give advice?—*A.* I think that is a danger to be guarded against.

Q. The danger might become a very serious one. It might lead people astray. Is it possible to combine the functions of the local Director of Industries with those of an appointment which we may call now the Director-General of Industries in such a way that the Director of Industries will be a member of the Imperial department, liable to transfer, but not frequent transfer, from one province to another, and having the prospect of promotion as Director-General? Would that be an advantage?—*A.* That does not bring him under the Local Government.

Q. The relations of a local Director of Industries to the Local Government is a rather difficult point. This is not the case with the Geological Survey in which an officer, wherever he may be, in Burma or Madras, is absolutely under the orders of the Director. In some other departments the case is different, their officers are either partly or wholly under the Local Government. Would it not be possible for the local Director of Industries, who is a member of the Imperial department, to be lent to the different Local Governments for, say, a period of five years and to be placed under the orders of the Local Government for executive purposes subject at the same time to the Director-General?—*A.* I think that is conceivable and could be carried out.

Q. Would that not satisfy local susceptibilities?—*A.* There is an exact analogy in the Customs Department where the Government of India selects the Collectors of Customs. It is true that the Local Governments very rarely take an interest in what he does, but this will not occur in the case of industrial development. I think that of all the forms the one suggested by you is the most practicable.

Q. Supposing a Director of Industries is transferred from one province to another for officiating purposes or on promotion he would have to adjust himself to the new provincial atmosphere. Would it be an advantage for him to have a small Advisory Board of Industries?—*A.* I have my doubts about Advisory Boards.

Q. Supposing we start with three?—*A.* I do not see that it will be of very great assistance. He could always get the help of non-officials if he is the right type of man.

Q. You think then that it is practicable to have an organisation of the kind I have described, namely, a Director-General with local Directors of Industries under him?—*A.* Yes.

Q. And you are absolutely against the provincial industrial officer being associated in any way with a Board, either Advisory or Executive?—*A.* There may be some advantages of a general character in associating him with a Board but I do not look to any definite result from the Board.

Q. I have been keeping one or two matters in view during my recent rush through India. For example, in the matter of weaving there have been very great local variations and some of the variations are due to the fact that weaving experts have totally different methods in trying to teach the people. In one province you have one kind of loom and another kind in another province. Each province does not know what is being done in the other provinces. In a case of this kind would not a small Advisory Board be useful to the new Director of Industries in a province?—*A.* Would the Advisory Board be a permanent body with a tradition and an accumulated fund of experience?

Q. That is rather a difficult point. You think that the local Director of Industries would get all the advice from local men if he is the right kind of man?—*A.* If you get the right type of man he will gather round him a certain number of non-officials. If he is not the right kind of man then the Board will not help him.

Q. If you had an Imperial Service then the recommendations that such and such an industry should be helped would go from the local Director to the Director-General?—*A.* You could also have a provincial budget for this purpose. The question will eventually have to be faced as to whether the Local Governments should not have certain grants for industrial development.

Q. Is there any provincial Board of Agriculture anywhere?—*A.* I do not know. I have very little experience of agricultural matters.

NAGPUR.

WITNESS NO. 137.

Rao Bahadur D. V. Bhagwant, Shri Lakshmi Oil Mill Co., Limited,
Akola, Berar.

Written Evidence.

I have been the managing director of the Shri Lakshmi Oil Mill Co., Ltd., since 1905, when it was established. Its paid up capital is Rs. 1,05,000. The company owns an oil-mill at Akola in Berar which at first crushed linseed only. Subsequently in 1912, it was extended and equipped for crushing sesame, groundnuts, castor seeds and similar oil-seeds. In 1914-15 a cotton seed department, including a refinery, was added.

There are eight oil-mills between Shegaon and Nagpur on the Great Indian Peninsula line. All of them are operated by steam power and use hydraulic presses for expressing oil. Most of them crush linseed and have been prosperous mills. The oldest among them is, I believe, of about 45 years' standing. The oil seed industry.

In the following answers I will confine myself chiefly to the consideration whether cotton-seed oil-mills can be successfully established in India. I will assume that it is eminently desirable that cotton-seed, which in recent years has been exported to Europe in very large quantities, should be worked in this country, thus affording food for men, cattle, animals and plants.

There is this peculiar advantage about cotton seed oil-mills that they can be established and worked by small capitalists. Cotton seed is a bulky material, which costs much to convey to a distance; and is apt to get heated when stored in large quantities. The best results are obtained when it is crushed on the spot, and as fast as produced by the ginneries. There is however this disadvantage about these mills. They can be worked most economically and with the best results during the cotton-ginning season only, which lasts about six months. During the remaining six months the machinery must remain idle or crush stored seed or other oil-seeds.

Several cotton-seed oil-mills have been recently established in British India and Berar; but, so far as I know, none of them has yet proved successful. The reasons for this, in my opinion, are mainly two—

- (1) want of skill in operation, particularly in the operation of refining the crude oil,
- (2) want of remunerative markets for the products of the mills.

Both these desiderata can, I think, be supplied.

The former want can be supplied by having for instruction, for the whole country, one cotton-seed oil-mill, including a refinery fitted with the best and most up-to-date appliances, and operated by skilled workmen under the supervision of a competent chemist.

The mill will be on a railway line in a district where seed can be had fresh and in abundance. The mill should provide instruction to all those who desire to learn the trade. A substantial fee might be charged to the students. Subject to regulations, the students should have full and free access to every department of the mill and the refinery, as well as to the accounts of operation, and also opportunity to practise the various processes themselves. The students should be men with long and practical experience of mechanical engineering, who hold second or first class certificates under the Boiler Acts, and who preferably have had a full course in engineering, in a technical school like the Victoria Technical Institute at Bombay; or they should be men who have taken the B. Sc. course or higher degree in science and have subsequently studied in the laboratories of the Tata Institute at Bangalore or other laboratories for at least two years. These last can learn, at the mill, the art of refining only. The former can learn both, the manufacturing of crude oil as well as its refining. My opinion is that a six months' attendance would be ample.

If possible, the mill should not be owned and managed by the Government. Government supervision and management is likely to be very expensive and should be resorted to only as a last resource. The supervision and the management should preferably belong to private persons who are already in the business and known to possess superior experience and skill in manufacturing and refining cotton-seed oil. A liberal subsidy or grant-in-aid should be made to them, so that they might have little reason to neglect instruction of students, which is the object of the subsidy or grant-in-aid. At the same time, the grant should not

be so large that it would have the effect of discouraging competition. I am unable to say whether the mill should be placed under the control of the Education Department or of the Department of Industries; nor am I in a position to define the extent and nature of the control which these departments should possess. I repeat, however, what I have said, that every effort should be made to provide the instruction at a private mill. It is only when all efforts in this direction fail, that I am willing to advise that Government should step in and establish their own mill, and I advise such an expensive measure, involving risk of waste, because I feel that the interests of a future prosperous industry for which India possesses peculiar advantages are at stake.

Can a central refinery supply the needed skill in refining?

The most difficult operation in a cotton-seed oil-mill is that of refining the crude oil. The few cotton seed oil-mills which have been recently established in British India have each their own small refinery. The refining is done by persons who, in most cases, did not possess previous experience and skill. This is necessarily so; for a small refinery cannot afford to employ an expert refiner from a foreign country and there are, as far as I know, no expert refiners in India itself who would be willing to accept employment for a modest salary. As a consequence, the refined oil which is produced is inferior to other competitive oils made from groundnuts, sesame, safflower and other seeds. One remedy to improve the refining is to establish a refinery in a central situation to which local mills will send their crude oil, instead of trying, as at present, to refine it themselves. The large central refinery will be in a better position to employ an expert refiner and produce a really edible oil. In the United States of America, where there are the largest number of cotton-seed oil-mills in the world, the practice is not for each separate cotton-seed oil-mill to try to refine its own crude oil. There, the mills sell their crude oil to large and centrally situated refineries. This solution of the difficulty, however, is not practicable at present; for a large and central refinery cannot be established until we have first a number of cotton-seed oil-mills producing crude oil. Moreover, it is to be feared that the central refinery people, in the absence of competition, would compel the cotton-seed oil-mills to sell their crude oil at an unfairly low price.

As soon as a number of cotton-seed oil-mills are well established and have begun to pay, the *All-India* cotton-seed oil-mill, private or Government owned, for the practical instruction of students, which I am advocating, will become unnecessary and the grant for it should be withdrawn.

In the absence of a mill, either private or Government owned, which I am recommending, I have little hope that a private owner of a cotton-seed oil-mill will be willing to give to students or intending competitors free access to his works and full facilities to learn the trade and its secrets, and it will take a very long time for an extensive oil mill industry to build itself in this country. This is not all. In the endeavour to build such mills, there will be many failures, waste of energy, loss of capital and disappointments. All these evils may be to a great extent avoided by the provision of an *All-India mill* for imparting practical instruction on a commercial scale.

In explanation of the second desideratum, which I have mentioned, I have to say that the chief difficulty which cotton-seed oil-mills have to face at present has regard to markets for their products. There is frequently no immediate or large market for these products in up-country districts, that is, in places where the seed is produced and where the mills ought to be established.

The oil, cake, lint, hulls and soap-stock bring prices which are not, so far as I know, ordinarily remunerative. At times, when other oils and feeding stuffs are dear, the cotton oil and cake, which are the most important products, may bring prices which cover all expenses or even leave a profit. But there is an uncertainty, if for some years to come, they will ordinarily do so. It is a wellknown fact that oil produced from the Indian seed is very inferior, so much so, that in the United Kingdom, where it is most produced, it is considered fit only for the soap kettle. It is rarely, if ever, prepared for use as an edible oil in that country. Added to this inherent disadvantage, there is the fact that the art of refining is at present very backward in India. In addition to the loss in refining being very high, the refined oil smells foul when heated and is not always neutral, clear and of a brilliant yellow colour as it should be. Moreover, owing to the difficulty of disposing of hulls at a good price, the seed is frequently crushed whole, without decortication, and consequently yields a grade of oil which is inferior to what it would otherwise do. It cannot be denied that on account of its unfamiliarity and inferior quality, the people have frequently a prejudice against it. Fortunately, the taste of the mass of the people in India is not fastidious. Provided the oil is appreciably cheaper than other oils, it finds a sale in up-country places in small quantities and to a limited extent. In large cities like Bombay, the oil finds, at cheap prices, an immediate and large market. But the expense of sending oil to distant cities amounts to so much that it seldom pays to do so. It is far more difficult to market the cake. The press-made cake, unlike that

produced by the country *ghanis*, is very hard and seems in appearance to be devoid of all oil. The farmer and peasant require a cake which is soft and oily. Even when the cake is cracked and broken and ground into meal it is difficult to find purchasers for it at remunerative prices. Not that cattle which are long used to be fed with whole cotton seed will not take kindly to the cake. Nor is the practice of feeding cattle with oil-cake uncommon.

There seems little difficulty on these accounts. The difficulty is about the prices which the people are willing to pay for the cake. It is argued that if cotton seed itself sells at so much per maund, the cake, from which all nutritive oil is taken away and is left as dry as a wooden board, must sell very much cheaper. That the cake is more clean, that it is free from dirt and lint, and that it contains just the quantity of oil which the animal can well digest, are arguments which do not appeal to the common man. Experiments made at cattle-feeding stations, the practice followed at Government farms and dairies, and at Commissariat stations and the publications in agricultural bulletins do not ordinarily reach him and in rare cases when they do, they have little influence with him. To one argument, however, he is always open, and that is *cheapness*. He is poor and all his prejudices vanish when he can buy very cheap. The hulls present the most difficulty in Berar. They get heated when stored, are apt to catch fire, and are so bulky that large buildings are necessary to store them. It is most desirable therefore to dispose of them as fast as they are produced. They do find buyers, but only if sold at nominal prices. We made hulls in 1914 before the war, but a hundred pounds of them could with difficulty bring from three to four annas. A hundred pounds ought to sell at about 12 annas to one rupee. We could not use them in the boiler as fuel, for coal was found cheaper for this purpose. I have, however, every confidence that if placed on the market with perseverance, they will, in a few years, come into increased favour and bring remunerative prices. They are already reported to do so in Gujrat. Similarly, with the oil. It will gradually become more popular and command better prices, especially so when the refining comes to be better practised than it is at present. In the meantime, very great care must be exercised that the production of the oil and the hulls does not exceed the limited demand in the mofussil. Only so much should be produced as the markets will absorb. At the same time, care must be taken to keep persistently the oil and the hulls and also the cake on the market to supply regularly and without failure such demand as exists and to meet further and increased demand. Such a control and regulation of production is only possible, in my opinion, in the case of a mill which does not depend solely on cotton seed for its raw material, but is equipped for crushing other oil seeds. This state of things, however, is only a temporary one, and will not last for many years. Once the oil and the hulls and the cake come into general vogue and begin to bring remunerative prices, mills can be erected which are devoted entirely to the crushing of cotton seed.

The lint from the linters can find already a ready and remunerative sale in Berar. It is used for making rugs and carpets, which is an ancient industry in this province. The soap-stock also is finding sale at Rs. 42 per ton but not at remunerative prices. These two, however, are minor products, which do not affect the question of cotton-seed mills in a very vital degree.

To bring cotton seed products into vogue in this country they must be sold for some years at very cheap and tempting prices. No manufacturer, however, particularly a small one, can afford to sell his products for any long time at unremunerative prices, to help the establishment of a new industry, however convinced he may be about the ultimate greatness of that industry. He will be the more unwilling to do so because there is no guarantee that other competing mills will not come to be built, once the industry is shown to be profitable. If the products of the mill must be sold at a loss for some years, this loss ought in fairness to be shared, in part at least, by the public revenues, because the successful establishment of the new industry means a great increase in the wealth and prosperity of the people, and an increased revenue to the Government, as has been strikingly shown in the case of the United States of America, and to a smaller extent in the case of Central Asia and Egypt. To form an adequate estimate of the possibilities to India from the new industry, we should remember that India is the second largest cotton seed-producing country in the world.

Another plan of assisting the new industry would be for the Government to guarantee the purchase of the products of the mills, in whole or in part, for a term of years.

A way to create a demand for cotton-seed oil would be to promote the allied industry of soap-making. This industry is capable of consuming enormous quantities of oil. Thus all the refined oil made from the Indian seed in the United Kingdom is used up in the manufacture of soap. There is this disadvantage, however, about cotton oil that it cannot produce a hard soap. For this purpose tallow or cocoanut oil is required to be mixed with cotton oil. I recommend, therefore, that a soap factory should be made.

available for the instruction of students in the same way as a cotton-seed oil-mill. This factory may with advantage be located in the same place as the *All-India* cotton seed oil-mill, as the latter can supply the former with its raw material. All oil which cannot be sold for edible purposes can then be used for making soap, as also all soap stock which will be produced by the cotton seed oil mill. The Presidency of Bengal, I have read, possesses some very good soap factories. It will not be difficult therefore to procure expert soap makers for the soap factory. The soap factory for the instruction of students should be, if possible, a private owned one. It is only when a private factory cannot be secured that Government itself should establish their own factory.

As soon as a number of soap factories are established with success and the knowledge of soap manufacture becomes general, the necessity for maintaining or subsidising a soap factory will cease to exist.

I have been informed that the principle of providing for the instruction of students in particular arts at a private factory has been already adopted by the Government in the Bombay Presidency, and that students holding Government of India scholarships are provided with facilities to learn and practise the art of refining castor seed oil at the well-known works of the Sabarmatti Mills which belong to the Bombay, Baroda and Central India Railway Company.

Up-to-now I have not mentioned the foreign markets which exist for cotton seed cake, both of the undecorticated and the decorticated kind. At Liverpool these cakes fetch good prices. My esteemed friend, Mr. B. N. Mudholkar, Managing Director of the Berar Oil Works, Limited (this is another and larger oil mill in my town which is equipped to produce both the kinds of cotton seed cake), has kindly furnished me with figures in respect of thirty-one consignments of undecorticated and two of decorticated cotton-seed cake which his mill sent to England in 1912-13 and 1913-14, before the war broke out. The average price which he obtained for the undecorticated kind was Rs. 63-2-0 and for the decorticated kind was Rs. 93-12-0. The proportions, however, of these amounts which went to defray the expenses to Liverpool were 59 per cent in the case of the undecorticated and 42 per cent in the case of the decorticated cake. It may be mentioned that the amount of expenses remains the same whether the cake is the decorticated or the undecorticated kind. From the smaller proportion of expenses to the gross total price in the case of decorticated cake one might be led to think that it must be more profitable to send decorticated than undecorticated cake to England. But it may not be really so.

The secret of the prosperity of the cotton seed oil industry lies *chiefly* in the ability of the manufacturer to dispose of his cake at remunerative prices. In the figures about the 33 (31 *plus* 2) consignments to Liverpool which my friend, Mr. Mudholkar, made in 1912-13 and 1913-14, the undecorticated cake brought to his hand an average price per ton of Rs. 27-3-0 only and the decorticated cake Rs. 54-3-0 only. These are not such prices as to make the industry a profitable one. The table given below will make this clear.

Table showing average products and values obtained from one ton of seed crushed whole without decortication in the years 1912-13 and 1913-14:—

	Rs.	a.	p.
Refined oil, 269 lbs. at Rs. 7 per 38 lbs. calculated on the basis of a yield of 12½ per cent refined oil per 100 lbs. of seed	50	0	0
Undecorticated cake, 1,881 lbs. at Rs. 27-3-0 per ton, on the assumption that the dirt, sand, &c., amount to lbs. 90 per ton	22	13	3
Lint, 16 lbs. at Rs. 2-8-0 per 28 lbs.	1	6	9
Soap stock	0	12	0
Total	75	0	0
Less—			
Cost of one ton of seed at Rs. 56 per ton	56	0	0
Cost—manufacturing and selling, including all over-head charges at Rs. 30 per ton	30	0	0
Total	86	0	0
Loss per ton	11	0	0

I am unable to give a similar table in respect of seed decorticated prior to being pressed because the quantity of seed so treated was small.

The cost of Rs. 30 per ton might be objected to as too high, but it is established by several years' experience. It must be noted that it is not merely the manufacturing cost. It is calculated as follows:—At the end of the year when the accounts are balanced and the final figure of total expenditure arrived at, this figure is divided by the total weight of seed crushed in tons. The result obtained is taken as the cost per ton. I know many people have come to grief because they under-estimated the cost. In this connection I take the liberty of giving an extract from the book of Professor W. D. Ennis entitled "Linseed Oil", page 158. "With the mill 'working cost' of 4 to 8 cents per bushel, 'the actual cost of operation has only begun. Thus, in one example, the monthly cost 'of barrelling exceeded the entire working cost, freight and dryage amounted to half the 'working cost, executive and selling expenses equalled the working cost. It is these items, 'which must all be considered in arriving at the cost of oil, that lead manufacturers to speak 'of the working cost as from 15 to 30 cents per bushel, rather than from 4 to 6 cents 'per bushel."

The cost of Rs. 30 per ton includes depreciation on plant, buildings, bags, stores, reserve parts, furniture and live-stock, insurance, interest, all kinds of losses such as missing bags, fuel, press cloth, and all kinds of stores, repairs, wages, salaries, taxes, all overhead charges such as the commission paid to the directors, and all kinds of miscellaneous expenditure including selling expenses.

To revert to a consideration of the form of Government aid to the cotton-seed oil industry, the plan of making a grant-in-aid to the manufacturer to recoup a portion at least of the loss he suffered appears to me to be difficult to carry out, for the questions would arise:—(1) How is the amount of the grant to each manufacturer to be fixed with justice and impartiality to all? (2) How are the interests of the general tax-payer to be safe-guarded? These questions are so difficult that I confess I cannot answer them satisfactorily. The second plan which I have suggested, *viz.*, that the Government should guarantee the purchase of the products of the mill, in whole or in part, for a term of years does not seem to me difficult to adopt. In respect of this plan the chief question to answer is to what use the Government can put the goods it would purchase under the plan. Government cannot manifestly buy the oil or the linters or the soap stock. It has no use for these. But to a small extent it has use for the oil cake and perhaps the hulls. The Government can order these for its farms, dairies and military establishments. Perhaps it can advise local bodies to buy them for their cattle. But the aid given in these ways would be quite insufficient. Moreover, the action of the Government is not likely to bring the cake and the hulls into more favour with the agriculturists. I would suggest therefore that every year the Government should purchase quantities of cake and hulls at prices which would be reasonable to the manufacturer and then distribute the goods so bought either gratis or at nominal prices among the agriculturists. Such an action on the part of the Government will, in my opinion, bring the cake and the hulls more and more into fashion and its benefits will be enjoyed equally by all cotton seed millers. Agricultural co-operative credit societies may be treated with special favour in the distribution, as thus the membership of the societies will be made more attractive. No other form of Government aid is, in my opinion, more suitable under the circumstances.

In the table given above (paragraph 22) the average price of undecorticated cake in 1912-13 and 1913-14 is shown as Rs. 27-3-0. This price was obtained by sales made in Liverpool. Had the price obtained been Rs. 40 per ton there would have been no loss in crushing cotton seed. Now, while most of the cake made by our friends of the Berar Oil Works, Ltd., was sent to Liverpool and sold there, some small quantities were sold by retail sale locally at Rs. 32 per ton *ex-mill*, thus showing that, provided the output of cake is such that the local market will absorb it completely, the loss per ton of seed need not be so high as Rs. 11. Had the oil sold at Rs. 7-10-0 per maund of 33 lbs. and all the cake at Rs. 32 per ton, there would have been no loss, although there would have been no profit. Thus it is all a question of local markets at a little better prices than at present.

I have long and earnestly thought whether the District Boards and Municipalities cannot give help in promoting industries. The cry has been that Government should start technical schools, undertake research work, establish pioneer and demonstration factories, hold industrial fairs and exhibitions, finance industries and encourage and help trade in other ways. Cannot the local bodies take a share in this good work? I think they can and ought to.

I know that the means of the up-country local bodies are small. I admit also that the promotion of industries cannot rank as high as sanitation and the other duties which they at present perform, and which generally absorb all the funds at their disposal. Yet, I contend, that the duty of promoting industries should be expressly added to their other duties. Local bodies will have to obtain more money by taxation to be able to establish and maintain technical or industrial schools, and to promote industries. The power to levy this increased taxation should be conferred on them. The money thus

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Local Boards and
Municipalities.

raised will ordinarily be spent on technical and industrial education. In those cases in which it is wished to assist an industry, like that of cotton-seed oil-mills, the local bodies should be able to do so only in co-operation with or with the approval of the Government. A restriction of this kind would be beneficial to them as thereby they would have the advice and guidance of Government. It will also prevent abuses.

I am strongly of opinion that an alteration of the laws for the purpose of expressly giving local bodies liberty to raise and spend taxes on the encouragement and promotion of industries will do much good by enlisting the co-operation of the people and making them more self-reliant and self-respecting.

Railway freights.

We are dissatisfied with railway freights. One would naturally expect them to be, in respect of long distances, proportionately less for less mileage. But they are not so. Take for instance the grain rate from Pipariya (a station from which we bring seed for our mill) to Akola, a distance of 316 miles. The rate is Re. 0-9-5 per maund. But this is also the rate for 505 miles from Pipariya to Bombay. This is typical of numerous other cases.

We have had several extraordinary cases of disparities in railway freights. Kirkee is a railway station 411 miles from Akola. Poona, the next railway station after Kirkee, is 414 miles, that is, 3 miles more distant from Akola. Now, 20 tons of oil cake sent to Kirkee are charged Rs. 399-8-0 and 20 tons sent to Poona are charged Rs. 172-11-9, that is Rs. 226-12-3 less for three miles more. We have this experience several times every year for we send oil cake to Kirkee and Poona.

We are much handicapped in our business owing to the high rates for grain. Our supplies are often drawn from Pipariya, Itarsi, Banapura, Harda, Chanda and Warora—all distant stations from Akola on the Great Indian Peninsula Railway. A special concession rate from the above stations to Akola for seeds to be used for crushing would be a great help to our industry.

Another cause for complaint is the refusal of the use of sheds for *perishable goods* waiting to be loaded. Oil cake is justly classed as "perishable goods" because the least exposure to moisture will damage it and make it mouldy and unfit for cattle food. It has often happened that we had to forward goods while it was raining and there was plenty of empty room in the goods sheds at our station. But permission to deposit our cake in these sheds while waiting to be loaded was refused on the ground that the sheds were intended for storing unloaded goods. No sheds have been provided for protecting *perishable goods* from rain while they are awaiting to be loaded. This is a great hardship.

Another complaint we have is that no specially favourable rates can be obtained for conveying the products of cotton-seed oil-mills. These mills, as shown above, have not become paying and therefore require to be fostered. But the railway people seem to be indifferent. They do not appear to have long views. They are not inclined to take into consideration the very large and increased traffic which a flourishing cotton-seed oil-mill industry would bring to them. Perhaps they are not convinced that this industry would ever flourish.

Training of labour and supervision.

I am of opinion that, if trained, Maratha Brahmins will make good managers and superintendents. I am a Maratha Brahmin. My community is noted for its intelligence, but its members are generally poor. Our ambition has hitherto been to shine in all those departments of life which require intellectual but not manual labour. No boy in the community is illiterate. It is the boys of my community who form the greater majority in the high schools. They form also a considerably large number of students in colleges. The superior students prepare for the Bar and a considerable number of them take up the medical profession and a few civil engineering. But few enter the commercial line and fewer still wish to become manufacturers. The prevailing opinion is that we are not adapted by nature for commercial or manufacturing work. Our ablest thinkers have very much deplored the existence of this opinion and have desired that the present universal tendency to follow the professions should be corrected. The basic idea of our oil-mill has been to show by example, on however small a scale, that by honest work even Maratha Brahmins can hold their own as merchants and manufacturers. Our mill is entirely managed by Maratha Brahmins. All the directors, the secretary, who takes care of the erection and manufacturing side of our work, and the assistant secretary, who does all the buying and selling, are Maratha Brahmins.

In order to develop industries in India, manual training must be made compulsory in the high schools, the students being required to attend classes in carpentry and smithy work for a certain number of hours every week. It may be objected to this suggestion that the high school course is already overcrowded with too many subjects. To this my reply is that the course might be extended by one or two years. At present, from the time a boy begins to learn English it takes him seven years to

become ready to appear for the matriculation examination. In future, the time should be eight or nine years. This will give the students ample time to do manual, side by side with literary, studies. If compulsion is considered too drastic a measure, then I propose that the students should be induced to attend the manual work classes by special privileges such as remission of half their fees.

By introducing manual training in the high schools we shall secure a supply of proper students for the Victoria Technical Institute at Bombay and other similar institutions which are intended to produce managers and superintendents for manufacturing and industrial works. The receipt of a little manual training will be no disadvantage to students who desire to prepare for the professions, only they will have to remain at school a little longer. I am convinced that in no other way can immediate and appreciable results be obtained in creating a liking for manual work among Brahmins. It is from Brahmins who have received industrial training that we shall be able to draw our future supply of managers, superintendents, and foremen. For besides their intelligence, resourcefulness and self-discipline, they possess the advantage of superior social standing which will enable them to command obedience from subordinates.

The linseed cake produced in the Central Provinces and Berar is generally all sent to Liverpool for sale. It is considered to possess peculiar virtues, and commands there a price which is higher than what its protein and fat contents alone would call for. In India, however, it hardly finds purchasers who are willing to pay the price that can be obtained by its sale in England.

Technical aid to industries.

Assistance in marketing products.

Indian linseed cake is almost always so imperfectly pressed that it generally contains from 9 to 12 per cent of oil, as against 6 per cent which the cake from North America as a rule contains. Now, it is the case with English farmers, and stock feeders, that the more oil they get in their cake the more pleased they are. The same is the case with the compound feed manufacturers in England. They prefer the more oily cake. Yet, notwithstanding these facts, and the additional one that Indian cake is made from seed which is more mature than the American, the price which Indian cake can fetch in the Liverpool market is equal or a little less than the American. According to its character and oil contents, the Indian cake should bring a better price than it does at present.

Several reasons may account for the discrepancy. Firstly, cake which is sold on a guaranteed analysis fetches a better price than one which is sold without such a guarantee. Indian cake, in the absence of facilities for obtaining correct analysis, is often forwarded without any guaranteed analysis. On the other hand, all American cake is offered for sale with a guaranteed analysis. This may explain the reason why Indian cake fails to fetch its proper value. Facilities therefore should be given to Indian oil millers to have analysis made at responsible Government institutions. I use the word *responsible* advisedly; because it has happened within my experience that a series of analyses at one Government institution were all wrong. To give one instance: on one occasion the whole seed was reported to contain 32.01 per cent oil, and the cake made from it 8.50 per cent oil. This was manifestly wrong, for the actual yield of oil from that seed at our mill was 34 per cent, *i. e.*, 7.61 per cent more than was demanded by the above analysis. If the analysis is wrong, the guarantee given on its faith makes the exporter liable to pay compensation. The result may even be worse; for the buyer may refuse to accept the goods in a falling market.

Another reason which may account for the discrepancy in the prices may be that while there are probably American representatives of trade on the spot at Liverpool, to take care of their countrymen's business, there is no Indian representative to watch the interests of Indian exporters. I have had inquiries made on one occasion through a European friend about the reputation in which our cake was held in the Liverpool market, the price it usually fetched, and other matters relating to the trade in linseed cake at Liverpool. My informant, who was practising as a broker in grains and seeds in the Liverpool market, sent me a reply in which, among other things, he said that Indian shippers of linseed cake were *victimised* in the Liverpool market. This may or may not be true. The circumstances, however, are manifestly such that there is need of a Government representative to look after the interests of Indian trade at Liverpool, to explain to Indian traders the requirements of the market, its likes and dislikes and to advise each individual exporter, if he makes the request, as to the point or points in which his goods require improvement.

Trade representatives.

I will give another illustration to show the desirability of having trade representatives. Our sesame cake was formerly all sent to Liverpool. Sesame seed is dear: but our cake used always to bring disappointingly low prices. After years, I read in an official report made by a representative of the Government of the United States of America, who had been sent to the European countries specially for the purpose of reporting on the trade in each country in oil cake, that "hardly any sesame seed was crushed by English

oil millers, and that sesame cake was not much appreciated by English farmers, and stock feeders. On the other hand, sesame was much crushed on the Continent, especially in France, in the Low Countries, and in Germany. Being the produce of home manufacture, every effort was made in these countries to bring its true value to the notice of feeders and consequently the cake was much appreciated." This may serve to show the desirability of having a Government representative not only in England but on the Continent to look after the interests of and to give advice to Indian traders.

Every province should have one full-time Director of Industries. He should be a business man and, if possible, possess experience of one of the industries, or at least a knowledge of engineering or chemistry or one of the sciences. Indian industries cannot develop properly without the help and advice of such an officer. The Central Provinces and Berar have effected important improvements in agriculture because in the commencement this Department was presided over by two eminent officers in succession. I appreciate very much the efforts and useful work which the Directors of Industries have been doing in the United Provinces, in Madras, and in the State of Mysore. Under the guidance of such officers there is every hope of saving what is left of old industries and of establishing new industries.

In a central place Government should permanently exhibit (1) labour saving and (2) safety appliances. Labour is getting exceedingly dear. Every manufacturer, therefore, is anxious to have as little labour employed in lifting, conveying, and handling things and material as possible. He is always on the look-out to see and study appliances which can save labour. An exhibition, therefore, in which the latest and the most varied devices for saving labour are shown will be of great service to him. Every manufacturer, moreover, is anxious to guard his employes from injuries. But often he does not know how best to do it. If he can know how other people have constructed safety guards in situations which he has considered awkward, he will be glad to follow their example. Devices for removing dust, smoke, and noxious gases, for admitting light, ventilators and all similar appliances which can conduce to the health, comfort and safety of the employes should find a place in the permanent central exhibition. As soon as a new device is on the market, it should be placed in the exhibition and brought to the notice of manufacturers.

Commercial
Intelligence.

One of the largest and most important oil seeds in India is safflower. It is not exported to Europe probably because no machinery has yet been devised which can successfully decorticate it. The seed is decorticated in stone mills and pressed in country *ghanees* in this country, and yields a good edible oil and cake. Oil millers in India would be much benefited in their commercial operations if they had forecasts of the safflower crop, and I would suggest that such forecasts be prepared and published in future.

Government
publications.

Speaking about the oil mill trade alone, I would suggest that bulletins, reports, periodicals and other literature concerning the vegetable oil industry, which may be published in future, should be supplied at a reasonable charge *directly* to oil millers and persons engaged in the oil trade who may register their names with the publishing department. At present we cannot easily know what literature is issued about the oil industry.

"The Indian Trade Journal" is becoming more useful. It contains now the valuable reports of the Directors of Industries. It can be made useful to those who are concerned with the Indian Companies Act, the Factory Act, and the Boiler Inspection Act, if the Reports of the Registrars and Inspectors under these Acts, and the Government Resolutions thereon, and the Rules and Regulations that are issued from time to time under the Acts all find a place regularly in the journal.

At present people have to be on the watch to see if any notifications affecting them are published in the Local Gazette—a publication to which up-country factory owners, as a general rule, do not subscribe. By insisting that all notifications shall regularly appear in the journal, factory owners will derive much convenience and benefit. They will also be able to know what notifications are intended to be issued or are issued under the above Acts in the other provinces. The journal may also usefully publish reports of the important trials under the above Acts, in whatever province they are held.

It would do a great deal of good if the journal could arrange to publish every week a full report in respect of the trade in oil-cake at Liverpool. Indian oil-cake, especially that made with hydraulic presses, is almost all sent to the Liverpool market for sale. Indian shippers of oil-cake therefore are naturally very anxious to have full knowledge about that market. The journal would be doing a valuable service by appointing its own special correspondent in Liverpool, and publishing his reports regularly every

week. The journal, until lately, gave the rates of vegetable oils prevailing at Hull by publishing extracts from the "Oil Colour and Trades Journal of London."

I am aware that commercial people in cities like Bombay consider the "Indian Trade Journal" of little use. This is probably because they have better and more quick sources of information. But factory owners and commercial men living up-country who have not such sources must depend upon the journal, which, with a little more enterprise and attention to the requirements of up-country manufacturers, factory owners, and commercial people, can, I am convinced, be made far more useful than it is.

Oral Evidence, 15th December 1916.

President.—Q. You say that there is difficulty in getting a central refinery because it would require a large expert and costly establishment. Could not the owners of oil-mills co-operate to own one central refinery?—*A.* There are only five mills in the whole of India at present, and with one exception, *viz.*, the mill at Navsari, they are not crushing cotton-seed only, but other seeds, and there is not enough crude cotton-seed oil produced to go to the central refinery.

Q. There is no use of starting a refinery until you have enough crude oil?—*A.* Quite so.

Q. Do you wish Government to start a central refinery?—*A.* Without the oil mills, how could they? There are not enough oil mills and, moreover, it is not enough to have one central refinery, because then it will compel the acceptance of its own terms.

Q. But if it were controlled by Government, or if it were a co-operative institution, then the owners would co-operate about the price? Do you think that in your district there would be a sufficient number of mills established to justify the foundation of one refinery?—*A.* There are only two oil mills in my district. There is room for more. In my town 23,000 tons of seed are produced.

Q. Possibly the absence of a refinery prevents the growth of further mills?—*A.* That is not so. The products of a cotton-seed oil mill do not get proper prices.

Q. A refinery would not be sufficient?—*A.* No.

Q. You recommend the improvement of your market for cake and other bye-products?—*A.* Yes.

Q. Coming to the question of railway freights, have you communicated with the agent of the Great Indian Peninsula Railway?—*A.* Several times. I have gone to the Commissioner, I have gone to the railway authorities, but my complaints have been ignored.

Q. Have they given you any reasons as to the apparent discrepancy in the rates?—*A.* No.

Q. Then you do not know the reasons?—*A.* No. In the case of Poona, I know there is a special rate for that city.

Q. Is the industry likely to be a large one to warrant the railway offering special rates?—*A.* Yes. We have the example of America before us.

Q. You say there are only five mills in India?—*A.* Yes. They are situated as follows: One at Lahore, one at Cawnpore, one at Navsari (Bombay Presidency) and two at Akola (Berar). The mills are so scattered and so distant that it would be very expensive to send their crude oil to a central refinery. The railway freight, the packing and other expenses, besides the loss of oil due to leakage on the long journeys would amount to so much that it would not pay to have their oil refined at a central refinery.

Q. You have suggested here that manual training must be made compulsory and if necessary the term of training should be lengthened?—*A.* Yes. Manual training should be introduced in the high schools from the bottom class to the top.

Q. If you concentrate your training in the earlier years, don't you think that you would produce a better class of boys?—*A.* Yes.

Q. They could not go on to the University without putting in a longer time in this way?—*A.* No.

Q. In other words, would you make it more difficult for them to get to the University?—*A.* Yes.

Q. You have made out a case for trade representatives at home to look after the interests of those who are selling oil cake. You think with reference to trade journals that it would be better if the Government issued journals dealing with particular subjects or groups of subjects so that when anything was published, for instance with reference to oil, it might not be buried in the Gazette with a large number of other notifications?—*A.* Yes.

Mr. A. Chatterton.—Q. You have a linseed oil mill at Akola?—*A.* Yes.

Q. Can you tell me why linseed oil is imported into India and why it is not all manufactured in this country?—*A.* I do not know. Linseed oil is eaten in Berar and the Central Provinces. There are mills which crush linseed but the oil is eaten.

Q. You boil the oil?—*A.* One mill boils a portion of its oil.

Q. Can you tell me why when a large market exists in India for boiled linseed oil, it is not made by the mills in the Central Provinces?—*A.* They do not make boiled linseed oil because without any additional cost or labour they can get good prices for raw linseed oil. They restrict their business to producing oil for eating.

Q. Have you tried boiling linseed oil?—*A.* No.

Q. You say that cotton seed oil mills can be established and worked by small capitalists?—*A.* Yes.

Q. What do you consider would be the output of a mill of the smallest size?—*A.* The capacity for decorticated cake would be 15 tons per day, and undecorticated cake 10 tons.

Q. You say you have extended your mill for the crushing of sesame, ground nuts and castor seeds, how often do you change from one kind of oil to another?—*A.* If there is a demand for linseed oil we go on crushing linseed for weeks together and if there is a demand for other kinds of oil, we make these.

Q. You have large godowns attached to your mills?—*A.* Very large and expensive godowns, because in my place all the seed has to be purchased at the harvest time. It cannot be purchased all the year round and so we have to store the seeds in godowns for the whole year.

Q. Have you asked for advances for stocking seed?—*A.* I have never asked for advances. We have had our own money and I have never experienced any difficulty. We have a branch of the Bombay Bank; but it is very troublesome to get advances from the Bank of Bombay.

Q. You are in the fortunate position of having enough capital to conduct your business?—*A.* Yes.

Q. You say a Government mill should be established for the training of mill superintendents and mill managers?—*A.* Yes.

Q. And I gather from your note that you consider that it is more important that the manager of the mill should be a chemist than that he should be an engineer?—*A.* The manager should be a chemist and engineer. He must have knowledge of both.

Q. Chemical knowledge is more important?—*A.* In the refinery.

Q. You say that the mill you recommend should not be managed by Government, but that it should belong to private persons who are already in the business and known to possess superior experience and skill in manufacturing and refining cotton-seed oil. Do you think that any one who has this superior knowledge and experience of oil milling would be willing to impart this information to persons who may become rivals in the manufacture?—*A.* I know from reports that the mill at Navsari (Bombay Presidency) is managed by a young American gentleman and produces the best oil. Whether the mill will receive students or not I do not know. If they won't the other course is that the Government should have a factory on a commercial scale for training managers.

Q. Do you think it would be possible to have a small mill and complete refining plant at an institution like the Institute of Science, Bangalore, where these people could be trained?—*A.* Yes. In London there is a Polytechnic in which students are taught the manufacture of varnishes on a commercial scale.

Q. Do you think that it could be done at a scientific institute like the one at Bangalore?—*A.* Provided they have the plant.

Q. You say in your note that all the Indian cotton seed which is sent to England is considered only fit for production of oil suitable for the manufacture of soap?—*A.* Yes.

Q. Do you think that you would be able to produce edible oil here if it is only fit for soap manufacture in other countries?—*A.* We are not so fastidious. We can sell the oil and it is used for cooking. Our tastes are not so fastidious as those of people in the West.

Q. Where do you get your market for the cotton seed oil that you produce now?—*A.* The chief market is Bombay for large quantities and small quantities we sell locally in our province.

Q. What do you do with the cake?—*A.* Whether it is decorticated or not it is mostly exported to England. Small quantities are sold locally for cattle food to Government farms and other private owners. But most of the cake is exported to England.

Q. Is any cake used for manure?—*A.* I know only one case in which the cake was used for manure, and a small quantity was used. It would be wasteful to use it as manure.

Q. What are you doing with soap stock?—*A.* We sell it to soap factories in the Bombay Presidency on the west coast.

Q. And you think that it would be better if you had soap factories established in connection with the cotton mills?—*A.* Yes.

Will you tell us how you refine your cotton seed oil at the present time?—*A.* By means of caustic soda. We mix the oil with a solution of caustic soda.

Q. Do you use a filter press?—*A.* Yes. For all oils.

Q. Have you a separate press for each kind of oil?—*A.* For cotton seed oil we have a separate filter press; but for other oils we have only one press.

Q. Is the machinery that you are using German or English?—*A.* The cotton seed department machinery is from America, and machinery of the other departments' is from England.

Q. Have you had any trouble about decorticating machinery from America?—*A.* We have a knife decorticator. Once the knives broke and we could not get them in India, and so we bought a disc huller. We have no trouble, now we can use both the hullers—the knife huller and the disc huller.

Q. The delinting machinery is American?—*A.* Yes.

Q. You say that there is plenty of scope for the establishment of oil mills in your province?—*A.* Yes.

Q. What would, in your opinion, determine the sites on which cotton-seed oil mills should be erected?—*A.* Mills should be established where the seed is produced, *i. e.*, where ginneries exist.

Q. You would not have a mill at a place like Navsari?—*A.* They have to import their seed from Bombay which is very expensive.

Q. Are you aware that that mill is making a profit or not?—*A.* They say that they do make a profit, but there are other people who say that they do not make a profit.

Q. They publish balance sheets?—*A.* Balance sheets can be produced to say anything. I say this, however, without in any way questioning the correctness of their balance sheets.

Q. Do you mind telling us whether in your experience a cotton-seed oil mill is profitable?—*A.* Our cotton seed oil mill does not pay us. We abandoned cotton-seed crushing, because we lost money.

Q. Do you know whether the American machinery which you have in your mill is similar to that at Navsari?—*A.* I was told that their machinery is like ours.

Q. Will you tell us how you manage your mill?—*A.* I am the manager, and my son is an engineer and a nephew of mine is a chemist.

Q. So that you have a complete control both on the engineering side and the chemical side?—*A.* Yes. Our company has 11 shareholders.

Q. It is a manageable body?—*A.* Yes.

Q. Do you produce a very highly refined class of oil, or deodorise it?—*A.* We do not deodorise or do anything of the kind, but simply produce yellow oil. Indian people do not care for the colour.

Q. What about the odour?—*A.* The oil gives a bad odour when it is heated, but afterwards it does not give a bad smell. It is used for sweetmeats.

Q. Have you made any attempts to produce an equivalent to vegetable ghee?—*A.* No.

Q. Is there any market in this part of the world for vegetable ghee?—*A.* There will be a market, but the difficulty is you must have a plant. It is very difficult and expensive to make ghee. I do not know much about it.

Q. Is there any scarcity of ghee in this part of the world?—*A.* What we Brahmins get in the bazar is ghee mixed with tallow. In Bombay there is a regular trade in this line. They import tallow from the United Provinces and mix it with ghee and sell it as pure ghee.

Q. Would you like some chemical or scientific institute to take up the question of the manufacture of vegetable ghee?—*A.* Yes.

Q. And work out the process which could be adopted in this country?—*A.* Yes.

Q. Do you think that there would be a large market for it?—*A.* Yes.

Q. The reasons why you have not taken it up is the fact that there is not a sufficiently worked out process?—*A.* It is beyond my capacity to think about these schemes. I am a small man. I have read about these schemes, but I have never given any serious attention to them.

Q. Do the ryots in your neighbourhood use cotton-seed as food for cattle?—*A.* All the agriculturists feed their cattle with cotton-seed.

Q. What is the prejudice against using cotton-seed cake?—*A.* Because the cake is very hard, and they say that all oil is taken out and the cake is devoid of oil. There is one omission that I have to supply. I have not stated in my statement the capacity of my mill and the hours of work. I have said that the cost of working is Rs. 30 a ton but that is an insufficient statement. The capacity of our mill is 10 tons for undecorticated and 15 for decorticated cake and the hours of work are between 12 and 15. We do not work day and night. If the capacity were more the cost would be less.

Hon'ble Sir R. N. Mookerjee.—Q. You propose a new tax giving local bodies liberty to raise and spend taxes on the encouragement and promotion of industries?—*A.* Yes. They may levy it if they like. There is a strong feeling among the leading people that they should encourage industries and they may be persuaded to levy a tax.

Q. Will you make that optional or compulsory to each Local Board?—*A.* Optional.

Q. Do you think they will levy?—*A.* I know many members of the municipalities and District Boards are willing to assist industries and for that purpose my idea is to give them an option.

Sir D. J. Tata.—Q. Do you decorticate the cotton-seed first always, or do you press the whole seed?—*A.* We only worked for a few weeks and we found we made a loss and we abandoned working. We decorticated the seed.

Q. You say that the machinery you have is the same as the one at Navsari?—*A.* The makers may be different.

Q. I understand that the Navsari people claim that they have machinery for decortication which is giving complete satisfaction?—*A.* There are only two decorticators in America, the knife decorticator, and the disc decorticator. There is no third type.

Q. Do you know of any English decorticating machinery?—*A.* No.

Q. Is your statement correct that the cake is left as dry as a wooden board?—*A.* It appears so. It contains, however, nine to ten per cent of oil.

Q. I understand that 5 to 10 per cent of oil is left in the cake?—*A.* In America they reduce the percentage of oil from 6 to 7. But in our mills the percentage left is 9 to 10.

Q. The cake is not left as dry as a wooden board?—*A.* It looks like that. If you analyse the cake, however, you find it contains 9 to 10 per cent of oil.

Hon'ble Pandit M. M. Malaviya.—Q. Can you make any suggestion as to the place where this All-India Cotton-seed Mill should be situated?—*A.* It should be in a central place on a railway where there are gineries. You must be able to get fresh seed and it should be on a railway in a central place.

Q. There is a great deal of cotton-seed produced in the Central Provinces and also in Bombay and there is also a great portion produced in the United Provinces. In view of these facts, have you any particular place which you think would be central for the purpose?—*A.* I cannot choose. The seed produced in Berar contains a larger percentage of oil and that in Bombay less oil. The cotton seed in the United Provinces contains a large percentage of oil but all places are equally good for a cotton-seed mill.

Q. Have you any idea as to what it would cost to equip a refinery?—*A.* I have not made any estimate. It would not cost much. The refinery consists only of tanks, and a few pumps and an engine.

Q. You have not thought out the cost?—*A.* It would not cost much. At the outset the highest cost would be Rs. 50,000.

Q. What about the recurring expenditure?—*A.* I cannot give you an estimate.

Q. Don't you think that a few of the proprietors could raise this small sum and start a central refinery?—*A.* There are only 5 mills at present in the whole of India. Only the Navsari mill confines itself to cotton-seed. The other mills work other seeds and there is not an enough number of mills to co-operate and think of a central refinery.

Q. You are opposed to the Government owning and managing this suggested mill. But do you think that if the Government deputed one of its officers to investigate the whole question and to place the result before the public, the people will be coming forward to find money to start such a mill?—*A.* We are not any longer in that stage. This industry is carried on on a large scale in several places in Egypt, Central Asia, and America, and there is no need of investigation. The only need is for training managers.

Q. By investigation I only mean putting together the facts which bear upon the question as to how much it would cost, the recurring expenditure and equipment, and whether it would be profitable?—*A.* The makers in America and England furnish a complete estimate to you for the smallest plant as well as for the largest plant, from 15 tons to 500 tons.

Q. You say, "In those cases in which it is wished to assist an industry like that of cotton-seed oil mills, the local bodies should be able to do so only in co-operation with or with the approval of the Government." Why do you want to limit their discretion?—*A.* For this reason, that a small municipality may abuse powers. They might assist a friend and abuse their powers, whereas if they were required to co-operate with Government, they would get Government advice and there would be no abuse of their powers.

Q. What you mean is approval of Government and not co-operation in any other sense?—*A.* No. The Government when they ask the local bodies to assist with money, will come forward with a grant themselves and so both will give money.

Q. You say, "I am of opinion that trained Maratha Brahmins will make good managers and Superintendents." Don't you think that others besides Brahmins will also make good managers and Superintendents if they receive training?—*A.* Others will also make good managers. But our people are after literary pursuits and therefore I say that they should be weaned from the literary pursuits and taught manual labour.

Q. It is not your object that Brahmins alone should be trained?—*A.* No.

Q. You suggest that manual training should be made compulsory in the high schools, and you mention the opening of classes in carpentry and smithy work. Suppose it is considered to be too strong a measure to make carpentry and smithy compulsory, would you make drawing a compulsory subject beyond the primary stage?—*A.* Drawing is a compulsory subject in the high schools in our provinces. Drawing is taught to all the boys.

Q. At what stage is it started?—*A.* From the first English standard they learn drawing up to the matriculation class.

Q. Both in boys' schools and girls' schools?—*A.* Not in girls' schools.

Q. You have expressed your opinion as to the usefulness of the "Indian Trade Journal." In order to make its advantages available to a larger circle of industrial people would it not be an advantage if it was published also in the vernacular of each province?—*A.* My opinion is that this journal requires more enterprise, which at present it does not show. It is not produced in a proper form in English. Before we think of reproducing it in the vernaculars it should be produced in a proper form in English.

Q. Assume that it is brought up to the standard which you think it should keep up, then don't you think it will be an advantage to the public, to the Bhatias, Marwaries, and other people who do trade, to have commercial information supplied to them in the principal vernaculars of the province?—*A.* I must know in what form it is going to be published. The present form is very imperfect.

Mr. C. E. Low.—Q. Can you tell me whether the Agricultural department has been able to give you any practical assistance in selling your cake as cattle fodder or as manure?—*A.* I look to them for assistance, but we must go beyond this. The people do not know what experiments are carried on in the experimental farms. What we need is that intelligent people should feed their cattle with this cake and should show the results to their neighbours.

Q. On the same lines as ordinary agricultural demonstration in other subjects?—*A.* Yes.

Q. Has any practical result arisen from the demonstration work done by the Agricultural department?—*A.* Yes.

Q. You speak of the desirability of trade representatives in the United Kingdom and elsewhere. The instances you give appear to me to relate to nascent industries or infant industries. You give two instances where trade representatives would be useful to an infant industry, or growing industries, but not so much to an established industry?—*A.* There are oil mills which have been established and it would be even useful for them if there was a trade representative in England.

Q. I quite agree, but do you think that a trade representative in England or in other countries would be useful to India after these industries have become established?—*A.* Yes. After the industries are established trade representatives will still be useful.

Q. You speak of the desirability of getting guaranteed analyses, that is authoritative analyses for the cake. How do you propose that it should be done?—*A.* I get my analyses done at Nagpur, but facilities should be given to all.

Q. How will the purchasers know that that analysis was done on a fair sample?—*A.* If the manufacture of the cake does not give a fair sample it is his own mistake. Everything depends upon giving an average sample.

Q. In guaranteed analyses in other countries, is it not the case that the fair sample is taken by some authoritative department?—*A.* No. It is the look-out of each oil mill owner. He takes care to see that the analysis is correct, because if the analysis is not correct the purchaser will not buy the cake.

Q. You think that the responsibility of taking up a fair sample might in India be left to the manufacturer?—*A.* Yes.

Q. Would you recommend a central authority for giving such an analysis or do you think it might be left to provincial agencies?—*A.* It might be left to provincial authorities.

Q. The President wants to know whether you think that provincial authorities would command the same respect for their analysis outside India as a central authority would?—*A.* If the analysis is guaranteed the purchaser makes his bargain on the basis of that analysis. If he has any doubts he might get the cake analysed in Liverpool or other places and if the guaranteed analysis is found to be incorrect there might be an arbitration. But the certificate of the guaranteed analysis itself will have no value. We will sell on the basis of that certificate. If there are any doubts about the analysis they will have a second analysis made.

Q. If by the second analysis the first analysis is found to be incorrect there would be an arbitration?—*A.* Yes.

WITNESS NO. 138.

Mr. Amritlal Howsa, Proprietor, Match Factory, Kota, Bilaspur District.

Written Evidence.

Capital.

*Q. 1.—*Indian capital is generally shy. It may be possible to commend capital for industries which have taken root and flourished. But when a new enterprise has to be launched, it is almost impracticable to obtain money from the public. When I started my match factory, I had the desire to raise the necessary capital on the joint-stock

principle, but as many other similar concerns which were formerly started had not proved successful, it was found altogether impossible to raise the money from the public by making my business a joint-stock concern. I had to invest every pie that I had at my disposal in building, machinery and initial experiments. Consequently I had to experience great difficulties on account of the lack of sufficient working capital. It is therefore completely essential for the Government to support new industries by assistance of every description. When a new business has to be brought into existence, the Government may guarantee the dividends for a limited period of time. The Government may advance loans at a reasonable rate of interest on proper security. The presidency banks and co-operative societies can be induced to help new industries by lending money to honest persons. The rate of interest must not be very high. I myself am put to great inconvenience for obtaining my working capital. If I can get a loan of twenty-five to thirty thousand rupees at four or five per cent, I can work my factory with greater ease and show better results.

Q. 3.—As far as my industry is concerned, there is no fear of having more concerns than can be maintained by India.

Q. 6.—When the Government has given assistance in some form, they must see that the money granted to the agent is not diverted to objects other than those for which the assistance has been given. The Government should not interfere in the internal management of the concern. Their control should be external. Government assistance.

Q. 15.—I have suffered much owing to want of technical and expert advice. In the beginning, I had to conduct various experiments in connection with match-making on a small and large scale. I lost much time and money in this procedure. If there was an expert to guide me in my work, my factory would have been much more successful than it has otherwise been. Technical aid.

Q. 19.—If the Government establish a model match factory, the existing factories would be greatly benefited. They might learn much from the Government concern.

Q. 22.—If the research work in connection with various new industries is conducted in India, business managers can personally see with their own eyes the work done by experts. It would be highly advantageous if we have a place which we can refer to for the solution of various difficulties which often come in our way and mar our progress. Experts should be supplied by the Government without charging anything. A reasonable charge should be made only after the business has been firmly established on a profitable basis. Demonstration factories.

Q. 38.—The Government should give preference to articles of Indian manufacture while buying their stores. The Government and railway companies can buy Indian matches if they are good and practicable. Government patronage.

Q. 40.—The Government should make facilities for the starting of new industries by free grants of land. Land policy.

Q. 44.—In India labour is unskilful, inefficient, and unsteady. It is very difficult to train them in a new kind of work. I experienced great difficulties in obtaining men who would work in the factory for a long period of time. In the match industry the machinery is very intricate. After a labourer becomes expert in some kind of work, he naturally gets good wages. As soon as he earns a small sum of money, he runs back to agriculture. I established a school for educating my labourers, but nobody attended, with the result that the masters, being disgusted with their task, left service. Training of labour.

Q. 54.—There is a difference of standard in the examinations of mechanical engineers in various provinces. A mechanical engineer of one province is not recognised in another. If there is uniform standard for certifying mechanical engineers throughout India, many difficulties would be removed. Mechanical engineers.

Q. 56.—There should be an advising Board in each province. Expert and technical advice is absolutely essential at every step in a new enterprise. Official organisation.

Q. 87.—For the convenience of match and pencil industries and similar other concerns which require suitable wood for their success, the Government should publish through the Forest Department, pamphlets giving information about the places where suitable wood can be obtained. The Government should supply wood to manufacturers by charging only nominal royalty. Government publications.

Q. 105.—The Government should not give match-wood by public auction. The contractor who gets the forest, charges a very high rate for wood suitable for the manufacture of matches. He thinks that the manufacturer must buy from him his raw material. Forest Department.

for any price that he would demand. The Government should, therefore, supply match-wood direct to the manufacturers. Also they must issue such regulations that small trees may not be destroyed. The trees that give suitable match-wood should be taken care of and should be allowed to grow into big trees. The Government can induce the Native States to give match-wood to manufacturers at a nominal rate.

As the match industry has to contend with the well-established and long-standing Japanese factories, and as Indian wood is not as white as Japanese wood, the business of match manufacture will not be able to stand in Japanese competition if the railways do not grant exceptionally concessional rates. The success of a new enterprise depends upon the facility with which the products are carried to the consumer. If the railway freight is heavy, it is impossible to work with profit. Up to the present the railways do not afford the convenience of concession rates as liberally as they ought to. For making new business successful, it is quite necessary that the railways should grant special rates more liberally to Indian products.

Oral Evidence, the 15th December 1916.

President.—Q. Can you tell me how long this factory of yours has been in existence?
A. 16 years.

Q. Was the match factory a paying concern?—*A.* It is a paying concern. I was a share-holder in a match factory at Ahmedabad. I came to understand that they were making good profits and then I brought machinery and set up a factory myself.

Q. What sort of technical expert did you have for a manager?—*A.* I had one London man and also one German.

Q. How long?—*A.* Former about six months. The German was only 15 days.

Q. You have had no regular continuous manager?—*A.* No.

Q. Then why do you expect the factory to be a paying concern?—*A.* It is a paying business now.

Q. In your accounts do you distinguish between the things that you buy in this country and the things that are imported?—*A.* I purchase the chemicals from Germany and from England and also the papers, labels and other things. I tried printing of labels here. They were printed but not properly cut.

Q. Can you tell us which cost more in the match factory, the materials obtained in this country or those that are imported?—*A.* The imported goods cost more.

Q. What would be the proportion before the war?—*A.* Including labour, it would be 60 per cent foreign and 40 per cent swadeshi.

Q. During the war the foreign material costs more?—*A.* More than 10 times.

Q. Is it a private factory or a public joint-stock company?—*A.* It is my private company.

Q. What does the labour cost?—*A.* About 10 to 12 per cent.

Q. How much capital have you invested?—*A.* Rs. 1,15,000.

Q. What return did you get on this?—*A.* Three to four thousand rupees.

Q. Is that net profit?—*A.* It covers only the interest. My factory is not going properly on account of some difficulties in getting things in proper time.

Q. Do you allow for depreciation?—*A.* I am deducting one thousand a year for depreciation on machinery. I got some of the machinery second hand and at present I cannot get some of the parts for wear and tear.

Q. If 60 per cent of the articles are imported and 40 per cent indigenous, what advantage is it to the country to make matches here?—*A.* This is a swadeshi concern. I started it simply from the business point of view in order to make profits. If the things that are imported can be produced here, for example zinc oxide, manganese and glue, etc., then we can do this industry successfully here. I would only have to import phosphorus.

Q. You want Government to supply wood. At present I cannot find any satisfactory reason for making matches in this country. Is there any real necessity for this wood for building, etc.?—*A.* The simool wood is not used for any other purpose except matches.

Q. You want most of these things to be manufactured here. For doing this you want a much larger market than merely the match industry. Nobody is going to start the manufacture of these chemicals for the match industry alone. The match industry must await the development of other industries?—*A.* That is no doubt true, but if you look at the total quantity of chemicals imported into the country you would find that it is very huge.

Q. How many match factories would be needed in India to meet the demand?—*A.* Hundred. I had been producing 1,000 gross per day, but owing to many difficulties I am producing only 300 to 350 gross at present.

Q. Where did you get your labels?—*A.* The machines here do not cut it nicely. I had therefore to get it done in other countries. I used to get labels from Germany and also from London.

Q. How do the Japanese and your matches compare in quality and colour?—*A.* My factory was closed for eight months because the steamer that was to come from Liverpool or London bringing me the goods I wanted did not arrive. It is now working for the past three months. The Japanese matches are no doubt whiter, but they break more easily and you have to light many sticks before one is ignited. In appearance the Japanese match is better but in quality mine is superior to the Japanese product.

Hon'ble Pandit M. M. Malaviya.—Q. Do you know if the Japanese Government is helping its manufactures?—*A.* I hear they are helping the industry to a great extent. I have spoken to people who went to Japan and they told me about it.

Q. You say that the presidency banks and co-operative societies can be induced to help industries by lending money to honest persons. The presidency banks as they are at present constituted cannot help industrial enterprises. In your opinion there ought to be a bank which would specially help industrial enterprises?—*A.* Yes.

Mr. C. E. Low.—Q. Where are you getting your wood? How much is good and how much useless?—*A.* I get it both from zamindaris and from Government. 50 per cent becomes useless.

Q. Where do you sell your matches?—*A.* From Madras to Cawnpore.

Q. What brand is it?—*A.* Sword brand.

Q. Have you got a sample of your match box?—*A.* Yes. Witness handed in a sample.

Dr. E. Hopkinson.—Q. What security would you offer for the loan which you desire?—*A.* The security will be my property. I am not indebted to anybody.

Q. What property?—*A.* The factory machinery and plant and building.

Q. To what extent should the loan be covered by the security?—*A.* If the Government advances 25 per cent of the security the work will go on well. I want Rs. 25,000.

Q. At what interest?—*A.* Not more than 5 per cent.

Q. Have you ever applied to the Department of Forestry for advice?—*A.* I have written to the department. They help but not to a sufficient extent. Owing to the coupe system sometimes we get an abundant supply and sometimes we get a very poor supply.

Q. Have you ever applied to the department for advice as to suitable kinds of wood?—*A.* The Forest Economist at Dehra Dun visited my factory. We also find out from the publications of the department.

Q. Did the Economist come at your request?—*A.* He came of his own will. He was touring and in the course of the tour he visited the factory.

President.—Q. What kind of manager have you got now?—*A.* I have got my own manager. Myself and my son-in-law are working at the factory. It is my opinion that it is only profitable if we work the factory on a large scale. If we do that then I can say that we can keep out Japanese matches to a great extent.

Q. Are you working every day?—*A.* Yes. I live very near the factory, almost in the factory, I may say, and we (I and my son-in-law) work 16 hours a day.

Q. Where are you getting your chemicals from now?—*A.* Wherever I can get it in the market.

Q. If only 40 per cent is swadeshi how can the thing be done here without first having the chemicals?—*A.* If more factories are started then the chemical manufacturers will surely come in.

Q. What sort of royalty are you paying for the wood?—*A.* 4 annas royalty per cart-load.

Q. How far is the factory from the wood?—*A.* 40 miles.

Q. What would it cost per cubic foot at the factory?—*A.* I shall work out the figures and send them.

Witness subsequently forwarded the following note.—Below is a list of the chemicals and raw materials showing the rates before the war and at present.

The cost of the wood is the same before the war and at present, *i. e.*, I pay Re. 0-4-0 per cart-load of fresh cut wood that it comes to nearly Re. 0-3-0 per cubic foot. The chief objection of pushing the match-making industry is the keen competition of Japan matches. If import duty on Japan matches, 25 per cent of the cost be laid, the Indian match-making industry will surely be successful.

List of the chemicals and raw materials showing the rates before the war and at present.

Name of the articles.	Approximate rate before the war.			Approximate present rates.			Rates per
	Rs.	a.	p.	Rs.	a.	p.	
Potash Chlorate	0	5	0	2	8	0	Lb.
Potash Bichromate	0	5	0	1	8	0	"
Caput Mortum	0	1	9	0	5	0	"
Zinc Oxide	0	4	0	0	10	0	"
Sulphur	0	1	0	0	2	6	"
Amorphus red Phosphorus	1	8	0	5	0	0	"
Antimony Sulphide	0	5	0	0	10	0	"
Strantia Nitrate	0	4	6	2	0	0	"
Barayta Nitrate	0	2	6	1	8	0	"
Glue of best quality	0	6	0	0	10	0	"
Gum Senegal	0	3	6	0	8	0	"
Paraffine wax of 123	0	2	6	0	5	6	"
Potato Starch	0	2	0	0	4	0	"
Blue paper in reels	0	1	6	0	8	0	"
Labels on yellow paper in black and red printing	0	1	6	0	6	0	1,000
Tin sheets of size 20 x 14"	9	0	0	35	0	0	112 sheets.
Dark packing paper	3	0	0	9	0	0	Ream.
Wire nails of various sizes	9	0	0	25	0	0	Cwt.

Q. How do you get your machinery repaired?—*A.* I have got my mechanic shop and engineers and fitters.

Q. Where did you bring them from?—*A.* From Ahmedabad.

Q. How many hands altogether do you employ?—*A.* Formerly there were 300 when the factory was working fully. Now there are only 100.

Q. What wages do you give them?—*A.* They are paid for piece work.

Q. Where did you get your machinery?—*A.* I bought some in an auction and many I bought new from Germany and some shortly worked by the Bombay factory that failed. They are the machines of the firm of Mr. A. Roller in Germany.

WITNESS NO. 139.

*Hon'ble Rao Bahadur N. K. Kelkar, Pleader, and Honorary Secretary,
Co-operative Bank, Balaghat.*

Written Evidence.

My main profession till about six months ago was that of a pleader. I have not so far been directly connected with any industrial concern, large or small, such as a mill or a factory, and I am not therefore sure if I can be regarded as experienced within the meaning of the summons I have received from this Commission. I have, however, suffered some loss from some of these concerns and gained profits from others. This led me to make enquiries into the causes of failures or success, and I desire to place my views before the Commission. I am not prepared to go so far as to suggest that the failures were due to dishonesty on the part of the management. I am strongly inclined to think that in many cases they were mainly due to lack of adequate knowledge of the business.

The educated people have begun to think of industries, or revival of them, but along with this proportionate progress has not yet been made in industrial education. The result is that, in their well meant desire to promote the industries of the country, people having little or no practical experience or knowledge of the business and with little or no training start industries or undertake the management thereof. Such men, though sound lawyers, or medical practitioners, or experienced Government servants, are not necessarily competent to manage industrial or commercial concerns. The failure of some of the important concerns in these provinces was, in my opinion, due to the management under such men. The failures of others might be due to other causes also. My own view is that industrial and commercial prosperity of this country will depend entirely upon men well trained in the business and such men to start with must have adequate openings.

The present tendency, even on the part of those who think or talk about industries, is to go in for the bar, or medicine, or for Government service, and those who have money generally invest it either in land or in money-lending. In the latter I include investments in co-operative banks. A few of those who invest in land do so not necessarily with the intention of promoting the agricultural industry. There has been some awakening now in mill and mining industries, but those who own these industries depend largely upon foreign expert advice.

Either in the matter of profession or occupation or in the matter of investment the existing general tendency is due to the impression which prevails in many quarters that commerce and industries are monopolised by Government for the benefit of their kinsmen in Great Britain, and that Indians have got no chance or prospect of material gain in them. Before going to other points I may say a word with regard to the accusation that is made against Indian capitalists. The timidity on the part of the Indian capitalists is due, I believe, to some of the aforesaid causes. The industrial regeneration of the country will depend entirely upon Government initiative. Unless Government comes to the rescue no good is likely to be achieved. Government aid may be in various ways. First of all the educational policy must be revised. Till recently in these provinces there was no school of handicrafts. Manual training was neglected and drawing is not yet a compulsory subject. Principally education is confined to literary training. It is mainly on account of this educational policy that there is growing tendency in the minds of the people to go in for Government service, or for the bar, or for some such profession. In other words the education we receive in our schools or colleges makes us fit for that kind of profession or occupation only. Indeed it was mainly on this account that the industrial association started by us in Balaghat in or about the year 1909 has not so far succeeded in achieving the main object with which it was started. The objects of the association are:—

- (1) to push the cause of industrial education amongst all classes of people,
- (2) to impart technical, industrial, mechanical and special craft education to boys by placing them as apprentices with some firms with a view to train them as master mechanics and craftsmen,
- (3) to help the boys with funds or otherwise to establish themselves in business.

The association was started under most favourable circumstances. The Chief Commissioner became its patron. Some firms in these provinces agreed to take up apprentices on most favourable conditions. Still we found considerable difficulty in recruiting boys as apprentices. It was very difficult to make people believe in the dignity of labour. I am inclined to think that our association has not been successful because we confined its benefits to boys in the high school classes. If we had commenced with the primary school boys perhaps the result would have been different.

Having regard to the temptations of easy life in Government service, or otherwise, and having regard to the fact that the boys themselves were given to home-loving habits, or not accustomed to labour in their early age, it was difficult, indeed impossible, to induce the parents or guardians to believe that manual labour has got a dignity of its own. I don't think it necessary to enter into the discussion whether elementary education should be made compulsory or not. It must of course be general, but in any case drawing and manual work should be made compulsory in primary schools. No time should be lost in making a beginning in this direction on as large a scale as possible. The application of this rule to boys from their early age would assist in getting trained labour and students better fitted for technical education. Boys accustomed to manual labour in this manner may be sent to work as apprentices in mills, mines or factories or in the Government School of Handicrafts. I would not confine this kind of training to any particular class. All who have an inclination for it or are likely to be fit for it may have it. Government should use its influence over mill or factory owners to take up and train apprentices.

The next step to promote industries would be to open industrial schools. The Industrial schools, number of Government technical scholarships to Indians may be increased. At present

the general policy is to bring experts from outside to investigate the possibilities of industries. This policy may be replaced by training Indians either in this country or elsewhere to qualify themselves as experts to undertake investigations.

I have got no pronounced views whether the proposed industrial schools should be subordinate to the Director of Industries or to the Education Department. All I want is schools. The other detail (after all it is a detail) as to whether they should be subordinate to the one or the other may be settled in consultation with those who are best competent to decide it. My main point is that unless a sufficient amount of technical and expert knowledge is created in the country itself it is useless to think of industries. So long as our industries depend or are made to depend upon external advice or outside initiative local or national industries are not likely to succeed. This leads me to another question which deserves consideration on the part of the Commission. Some of my aforesaid remarks may be construed to indicate that at present there is a general disinclination or aversion against industrial training or manual labour. The disinclination is due to causes which can be removed by Government. Instances have occurred in which men with requisite technical knowledge failed to secure suitable job or for want of employment in the line had to seek employment in a different line for the sake of their livelihood. The general belief is that owing to Government tariff policy or otherwise Indian industries have got a limited field, and men with technical or industrial knowledge have got little scope in that field for their livelihood. It was probably on this account that recently in Bombay a suggestion was made that commerce and industry graduates should be eligible for law. The B.Sc. and the agricultural graduates go in for law because the complaint is that there is no prospect for them except perhaps in the educational line.

I might suggest the following amongst the other remedies to remove this difficulty.

A separate department of industries, like that of agriculture and co-operation, may be opened, the different cadres of this department should be filled not by amateurs but by experts or trained men. Civilians may be good administrators, but for want of technical knowledge a department under their control is not likely to be useful. The appointments in this department should be open to all alike without distinction of race and colour, or of provincial and imperial service. Needless to say that prospects must be sufficiently alluring. The primary functions of this department should be research work, collection of statistics, and the investigation as to the possibility of success of new industries.

Speaking, not as an expert but as a layman I believe that concerns investigated, financed and for some time even managed by Government would have considerable educative value, and would, in addition to the Government department, throw a wider scope for employment to a large number of Indians. I may not be understood to say that such concerns should be monopolized by Government for ever. This may, after some time, be transferred to deserving private individuals who know local conditions well and whose business habits are beyond question.

It is thus that interest in industries may be stimulated and men competent to manage them may be available in sufficient number.

Government assistance.

As a rule Government assistance to any industry, old or new, should be on business principles, but in times of financial crisis or when, owing to war or otherwise, money market is tight that principle may be relaxed. In such cases money, grants-in-aid, loans without interest or with moderate or nominal rates of interest, or loans for machinery or for plant may be very useful.

For some of the reasons indicated above local capital is timid. There is want of mutual faith. Guaranteed dividends or contribution of part of share capital will create faith and carry the conviction of economic soundness to the public. That will attract large capital which otherwise would not be forthcoming. I draw this inference from my experience of the working of the co-operative movement in these provinces. Many people are found willing to invest their savings in co-operative banks simply because only with Government control and supervision they feel that the investment is sufficiently safe. Guaranteed dividends or contribution of share capital would add considerably to that sense of security. I have stated above that the Government assistance should be on business principles and should continue until the industries can stand alone. But after they become earning concerns there is no reason why the general tax-payers should not be reimbursed for the expenditure incurred in paying guaranteed dividends.

Having regard to the backward condition of industries abstention and aloofness on the part of the Government won't do. Mere goodwill is not enough, there must be material assistance of a practical nature. I do not grudge Government control and supervision, provided it is reasonable and is educative and instructive. Whatever may be the form of

help so long as the existence of any industry depends upon Government support it is but reasonable that Government control should be indispensable. Indeed as trustees of public money Government would be failing in their duty if they were to remove all control. It is not quite easy to lay down hard-and-fast rules specifying the nature of the control, that must depend upon circumstances, and upon the qualifications, capacity, and business habits of the management. As at present advised I am inclined to think that generally the control must be from outside and the appointments of Government directors with definite powers may be made when such a course is dictated by the exceptional circumstances of the case.

Closely connected with the above is the question how far the Government should guarantee the purchase of products. In my opinion the time has not come, and may not come for long, to lay down any limit to this form of Government aid. In my opinion the Government should patronize local products in preference to imported articles in spite of some additional cost. Government, local bodies and semi-public departments or concerns patronized by Government may be advised to follow this rule strictly. I am led to make this remark, as I am told that some of the existing rules which require purchases from local concerns are not strictly followed.

Government patronage.

Publication of lists of imported articles used in Government departments or their exhibition in commercial museums may be useful, but such publication or exhibition won't have the desired effect until preference to local products is strictly insisted upon.

Agriculture, weaving and brass work are the three industries which, to my personal knowledge, have been assisted by the co-operative movement in these provinces.

Sympathetic and active co-operation between the officials and non-officials has, with personal visitation from village to village, instilled the principles of co-operative credit into the hearts of the people which has resulted in the rapid expansion of the movement.

A list of industries which can be developed by means of co-operative societies is given in the Hon'ble Mr. Low's report on the industrial survey of these provinces, 1908-09. I have nothing to add to that list. I think all such societies must, like agricultural societies, be with unlimited liability. Their special object should be to preserve and improve the industry with the minimum of labour and expense and the maximum of output of superior quality. With the aid of improved machinery and adequate capital these may be converted into small local factories. I am not sure if the hand industry can compete with the machine industry, at least so long as the hand industry is not considerably improved. In co-operative societies, if we clear off old debts carrying exorbitant rates of interest and advance sufficient money for all legitimate purposes, I think we ought to be able to make substantial improvement in agriculture. So far in these provinces we have had no difficulty in securing money for business. Land tenures in these provinces do not afford sufficient security to the investing public. If the recommendations made by the MacLagan Committee are accepted that difficulty would disappear. Our present experience is that in these provinces agriculture is perhaps the only industry which can be helped and developed by means of co-operation. With regard to the assistance to and development of other industries, such as weaving, by means of co-operation, we are rather becoming pessimistic, though we have not yet lost heart or abandoned them altogether.

Co-operative societies.

The local law of these provinces, *viz.*, the Land Revenue Act, allows acquisition of land required for purposes connected with mining operations by lessees from Government. Such acquisitions are made very nearly in accordance with the provisions of the Land Acquisition Act. Government is interested as much in mining as in other industry as revenue derived from all industries goes to public treasury. There is, in my opinion, no difference in principle, and the concession may be extended to other industries also.

Land policy.

Local or Indian industries are already suffering from competition. At trade centres in these provinces the market value of the land has increased. Instances have occurred in which private enterprises had to pay fabulous or prohibitive prices, far in excess of the reasonable values. These competition prices have their effect on the industry. Acquisition under the Land Acquisition Act would be an advantageous concession. The provisions may be extended to private individuals even though they have not constituted themselves into companies proper.

So far industrial developments of the provinces do not appear to have been directly affected by the land policy. But efforts are being made to introduce such checks which, if enforced, might impede the development of the industries. The policy of revising the assessment of land revenue during the currency of the term of settlement if the land is diverted from agricultural to non-agricultural purposes, or of taking premium on such conversion, may be very sparingly used or not used at all. Generally the settlement of such land should be for a much longer period than the one of land used for agricultural purposes.

In these provinces the assessment of land revenue is made on land used for all purposes. This practice is now codified into law. The assessment on land revenue on income derived from land otherwise than by agriculture causes great hardship, and if the practice is not considerably modified, I am afraid people will cease to grow materials which are commercial commodity. Such income is at present classed as miscellaneous income though the revenue derived therefrom is comparatively large. Lac, harra (myrobalam) and bamboos are some of the articles grown in malguzar forests which, commercially and industrially, are very important. Considerable hardship is experienced in connection with the first article. Owing to the methods adopted in assessing land revenue on this income some people cut the palsa trees on which lac is generally propagated and convert the land to agricultural purposes.

There is no statute law in these provinces to regulate the rights of the landlords and tenants with regard to the produce of the trees standing on tenants' holdings. So far as fruits and flowers of trees are concerned no difficulty has so far arisen. But with regard to lac the highest tribunal in these provinces has held that it is neither fruit nor flower, and therefore it belongs to the malguzars, on the analogy that the property in the trees in which lac is propagated belongs to them.

If this ruling has correctly interpreted the law, in my opinion, in the interest of the industry, it ought to be repealed at once by an express provision in the statute. The practical effect of this ruling is that tenants cannot allow palsa trees to grow or to stand on their lands, and consequently the malguzar cannot propagate any lac thereon. There are large areas of tenants holdings on which palsa trees for propagation of lac can be most advantageously used. But in consequence of the above ruling it is found impossible to do so.

In making assessment of land revenue the Chief Commissioner issues instructions for the guidance of the Settlement Officers. Such instructions, so far as one can judge, are issued mainly with a view to safeguard or increase public revenue. As far as one can judge in all these instructions due regard does not appear to have been given to the development of the industries. In my opinion the Provincial Board of Industries, of which the Director of Industries is the President, should be consulted with regard to the principles of assessment of land revenue on products useful for industrial development and the recommendations made by the Board should be duly considered.

Official organisation.

A Director of Industries is appointed. A Board of Industries for C. P. and Berar was constituted in 1914.

The activities of this department are summarized in the Director's note, dated the 22nd August 1916, which, I believe, is before the Commission.

In these provinces we have got both a Director of Industries as well as a Board of Industries. In another part of my note I have pointed out that if the department is to be of any practical use the Director must be an expert with adequate knowledge of the industries. If administrative control is essential one from the Secretariat would be enough.

The Board of Industries consists of officials and non-officials nominated by the Local Government. Its functions are at present advisory. In my opinion the time has not yet come to make any changes in the present arrangement. Time may come, when I can't say, when the Board of Industries may require executive powers and funds. The present arrangement is working satisfactorily, and if it continues to do so, the question of extending the powers of the Board and of defining the relation between the Board and the Director and the Administration may be considered. Under the present circumstances I don't feel competent to pronounce any definite views. I may suggest that in the meanwhile individual members, if they so choose, may be given facilities to inspect any works or may be helped with information which might lead to the development of the industries. I beg to take the liberty to suggest that the usefulness of the department and the activities of the Board may be enhanced if subsidiary committees in the districts are organised to help the Provincial Board.

The Provincial Board consists of 3 or 4 officials and about 5 non-officials. The officials have an organised machinery at their disposal to collect information. The non-officials have not. Five or six non-officials from the combined province won't be able to deal with industrial problems concerning the province. The object of the district committees is to widen the sphere of popular interest in industries. The organization of the district committees will create opportunities for many more people to think of industries and possibly to assist them. Now, when there is some awakening in industrial matters organization of district committees would be easy.

In these provinces associations, named agricultural and technical, were formed years ago. These associations seem to have forgotten or kept in abeyance the industrial side of their activity. If district associations throughout the province are not considered advisable

they may at least be started at places where some cottage or other industry of considerable local importance is to be found. My proposals on this subject are before the Local Government, and any advice or recommendation from the Commission would be very helpful.

In my note dated the 28th September 1916 (copy below) to the Director of Industries, Central Provinces, I have mentioned supplies of some raw materials for which there is a good case for investigation. With regard to harra (myrabolam) I might say that the Balaghat District alone produces tons of harra every year. I have reason to believe that a large portion of it is not picked and exported. I am told that tannic acid can be extracted from harra.

General.

The Balaghat and surrounding jungles produce large quantities of creepers (*bukkels*) from which very strong ropes can be made with the aid, I am told, of special machinery.

Bauxite from which aluminium can be extracted, is available in the Balaghat District above the ghat, but this is not yet exploited for want of railways and electric power. The surveys for the former are, I am told, made and for the latter there are natural advantages in the Nahara and Uskal rivers. Owing to want of railway the manganese mines near Ukwa in this district cannot export any ore from there.

Letter, dated Balaghat, the 28th September 1916.

From—The Hon'ble Rao Bahadur N. K. KELKAR, Pleader, Honorary Secretary, Co-operative Bank, Balaghat,

To—The Hon'ble Mr. C. G. LEFTHWICH, I.C.S., Director of Agriculture and Industries, Pachmarhi.

I am in receipt of yours of the 24th instant. Before the receipt of this letter I visited Gondia to see the lac refining factories there. Only one out of the 4 factories is working there now. The remaining 3 are closed for reason the accuracy of which I am not in a position to vouchsafe. The one that is working now formerly belonged to a Marwari's firm at Gondia, but is now taken over by a firm from Mirzapur. The expert labour is imported from Mirzapur, and is supplemented by unskilled local labour. The concern is worked by manual labour. It is a small one. From what I saw I am inclined to think that there is scope for expansion of the lac refining industry in these provinces. In the course of my enquiry I learnt that the work of any of the factories at Gondia (defunct or existing) was never stopped for want of supply of lac. Gondia is one of the largest centres whence thousands of maunds of stick or unrefined lac, both Palsadi and Kosam, are exported generally to Mirzapur in United Provinces and to Calcutta or Cossipur in Bengal. Even if all the 4 factories were working, I was told, they would not consume even half the export of lac from Gondia itself. Some of the Satpura forests produce large quantities of lac, and if, for any reason, Gondia is considered to be an unsuitable place either for refining or for any other industry out of lac some other place on the Satpura Railway line may be selected for the purpose.

Lac propagation or cultivation is not expensive. The propagation or cultivation is done generally in an unscientific manner. On that account or otherwise the expenses are comparatively large in proportion either to the yield or its value in money given at fluctuating rates. As stated before several maunds of lac are annually exported from these provinces to some other provinces, such as United Provinces or Bengal, and thence in a refined form exported to other countries. Lac is one of the raw materials in these provinces to which the Industrial Commission's attention may be usefully drawn. The method of propagating or cultivating the lac can be considerably improved. I am informed that in Central India scientific method for propagating lac is adopted. If that is done in these provinces it is possible that it would considerably increase the annual yield. Before leaving the subject I would suggest that the Commission or its Sub-Committee may visit Gondia to see the refining factory there. It is a small factory and probably bears no comparison to any in Mirzapur or other places. Local inspection or local enquiry may satisfy the Commission that there is a clear ground for further investigation into the development of the lac industry in these provinces in all its stages.

Harra is another forest produce which is exported in large quantities from some of the districts in these provinces, and similarly bones and hides. Manganese is too well known to need any mention.

Kindly let me know what has been done with my suggestion for starting a factory somewhere in these provinces for preparing ink powder. I have already mentioned to you bamboos which can be used for paper pulp. At one time a gentleman from Jubulpore was very keen in having a paper factory at Balaghat. He told me that the Balaghat jungles might supply bamboos to the factory for at least 25 years at the rate of some tons a day. I don't remember the exact quantity.

Oral Evidence, 15th December 1916.

President.—*Q.* Can you tell us more about this industrial association at Balaghat; what you have done since 1909, and what the results have been?—*A.* We started an industrial association in 1909. We sent some boys to the coal fields, and some apprentices to work in the mills. We succeeded in inducing about 10 boys in the first instance to go there, but one by one every boy came back, and there is now only one boy working in the mills at Badnera.

Q. Why did they come back?—*A.* For two reasons; first, because they were not accustomed to hard labour in the fields, and, secondly, they wanted some instruction in the English language. As no arrangements were made to give them technical education, and as they were made to work as coolies, they were not satisfied.

Q. What mill was that?—*A.* So far as the mill is concerned, we did not hear any complaint, but the complaints came from the boys who were sent to the coal fields in the Pench Valley.

Q. You said they were made to work as coolies?—*A.* Yes.

Q. How are you going to learn mining otherwise? I had to work like that myself?—*A.* We all know that, but the boys here are not accustomed to that sort of work.

Q. Is it not good for them to get accustomed to hard work?—*A.* Yes, it is quite good for them.

Q. You think that the experiment you made was a worthy one; that you did seek to benefit the boys, but they did not appreciate the good work you did for them?—*A.* No.

Q. You say there is one boy now who has stuck to work?—*A.* He is at Badnera, working as an apprentice in the cotton mills.

Q. Has no boy stuck to the mines?—*A.* No.

Q. Perhaps that was an exceptional case; would it be possible to send the boys to some other mines where they would be likely to get more suitable treatment, and where they have evening classes for boys?—*A.* That is what we want to do, but many proprietors refuse to make arrangements of that kind. They say that the boys must be made to work as coolies for two or three years, and afterwards some arrangements might be made to give them instruction in classes; whereas the boys' parents and guardians want arrangements made immediately. That was the cause of dissatisfaction.

Hon'ble Sir R. N. Mookerjee.—*Q.* Did you try the Bengal Coal Company's fields?—*A.* No, we only tried the Pench Valley and Ballarpore.

President.—*Q.* There was no chance there of boys getting any technical training?—*A.* Not at that time. It was a Government mine. We asked the manager, but he refused to make any arrangements.

Q. I suppose where there is a small number, and only one mine, it is difficult to make arrangements like that; but where you have several mines and evening classes, it would be easier for the boys. You could not expect boys to do work where they were not going to get any kind of technical assistance. It was entirely the fault of the boys you think?—*A.* Not entirely the fault of the boys.

Q. You have never tried that experiment since?—*A.* We never got any boys afterwards. We tried to recruit boys, but did not succeed. Once the experiment failed, it was very difficult to get the boys.

Q. Then your industrial association has not got very satisfactory results so far?—*A.* Not so far.

Q. What is your proposed line of continuing this association?—*A.* My present line is to induce the boys and parents, and if some arrangement is made in the coal fields or mines for giving them some technical instruction, I think some boys would come, but not till then. If they are made to work as coolies, I don't think we shall succeed in getting any boys.

Q. It may not be possible for a small field like the Pench Valley to arrange for this technical training, but it is already established in the Bengal Coal Fields?—*A.* I don't know that boys from these provinces will be willing to go so far as the Bengal Coal Fields, but it was quite possible to make some arrangement in the Pench Valley. The manager was very sympathetic but had his own notions about it. He did not want to give them technical education, until the boys had worked for two years as coolies.

Hon'ble Sir N. R. Mookerjee.—*Q.* What was their education when they went there?—*A.* Middle school class, i. e., 4th or 5th standard.

Q. What was their age?—*A.* Between 14 and 16; 18 at most.

President.—*Q.* Had they any knowledge of science or mathematics?—*A.* They had a knowledge of mathematics, but I don't know if they had any knowledge of science.

Q. That would be a drawback; you could not get the manager to teach them all these subjects?—*A.* No.

Q. Had you any high school in Balaghat?—*A.* Yes, we had then in 1909; in fact that association was started by the High School Committee.

Q. Have you tried any other industry but mining, and this one boy who is at a cotton mill?—*A.* No. I beg your pardon, we sent one or two boys to work as apprentices in the carpenters' shop, Biramjee's shop.

Q. Have you sent any of them to the School of Handicrafts at Nagpur?—*A.* No.

Q. Is there any reason why you should not do that?—*A.* I am trying for it.

Q. I suppose you will send more than one class of boy; what about the village carpenter?—*A.* The village carpenters are not so advanced yet. Speaking for my district, the people are not willing to come as far as this town. They have their own prejudices.

Q. They would not like to go so far away from their homes?—*No.*

Q. I have found boys from the Nagpur School at Seoni carrying on the carpentering business successfully. You cannot persuade anybody to come from Balaghat?—*A.* We are trying to persuade them, but have not yet succeeded.

Q. Can you form any idea as to whether it is advisable to send a boy from a place like Balaghat to a place like Nagpur for training in a school of the kind you have here. Would it break up the boy's home associations and do him harm?—*A.* I don't think so.

Q. You think there is no reason why he should not come and be trained in school here?—*A.* No.

Q. You have never succeeded in sending a boy from Balaghat to a school here?—*A.* No, only two boys to Byramjee's factory, and since then we did not succeed. There again we were unfortunate, because both boys died of plague. That was in 1911.

Q. That would produce a local prejudice again?—*A.* That is our difficulty in getting boys.

Q. You mention, besides agriculture, weaving and brasswork as industries that have been assisted by co-operation, and afterwards you say, "Our present experience is that in these provinces agriculture is perhaps the only industry which can be helped and developed by means of co-operation." In what way have the weaving societies and brassworkers failed to co-operate?—*A.* We have two or three weaving societies not working well. We find that all these weavers are very heavily indebted, and from my experience found that they have been carrying on their trade mostly on borrowed capital, at a heavy rate of interest, something like 25 per cent a month. Their whole indebtedness, however, is very large. Unless our co-operative societies are willing to take up their whole indebtedness, I don't think that weaving by co-operation has any chance. The co-operative society is not willing to lend them any large sum of money, as the security offered is not considered to be sound by the investing public. Another thing is that the weavers have to depend upon others for very many things. We have to make arrangements for purchasing yarn for them; for selling their cloth; and one famine or bad year or a year like this, when war is going on, prevents us from making any arrangements for them. Everything is dear: the yarn is very dear, dyes very dear, and they cannot compete with foreign industries.

Q. You have two difficulties: first, the weavers are hopelessly in debt; secondly, co-operation is not of much use unless you can co-operate for the sale and purchase of the materials?—*A.* Yes.

Q. Then you fear that it is a hopeless venture?—*A.* I am not yet hopeless; that is our present experience. Perhaps times are not very good on account of the war. It is only after the war that we have begun to experience this difficulty.

Q. But the war has not affected them very greatly; it has raised the price of yarn to a certain extent?—*A.* Dyes are very dear.

Q. But what are the weavers doing; what becomes of them?—A. They do some business but they are not prospering.

Q. How are they going to meet their debts?—A. They are in arrears.

Q. What happens when they become hopelessly in debt?—A. They are, as a matter of fact, hopelessly in debt at present. We are not willing to advance them sufficient sums of money on account of their past heavy indebtedness.

Q. Who do you mean by "we," the district co-operative bank?—A. Yes.

Q. Are you permitted to go outside agriculture and take up weaving too?—A. Yes.

Q. What about the brass workers; what is the difficulty with them?—A. They are also dependent upon others. They do not prepare parts of the utensils themselves. That is the difficulty with them. If they prepared the utensils themselves, I think there is some chance for them.

Q. They don't make the utensils themselves?—A. No.

Q. Who makes them?—A. We brought some men from other places to make utensils for them. They used to purchase the utensils from them and sell them.

Q. They are not brass workers then; they are brass-work dealers?—A. Yes.

Q. Don't you want to help them in any way?—A. Our idea was that they should learn to assist themselves in making the utensils.

Q. You would rather help the brass work direct?—A. Yes, it was with that intention that the society was started.

Q. Is there any chance of inducing any kind of co-operation among brass-workers?—A. Co-operation in what way?

Q. If you can get co-operation among the brass workers direct, you can get rid of these people who are brasswork sellers?—A. Yes.

Q. Who does any missionary work among these people; what steps do you think of taking to make these people better themselves?—A. In the first place a lead was taken by officials in the Balaghat district.

Q. I suppose they have no time to go into cases of this kind and foster industries?—A. No, they have no time.

Q. Does your industrial association undertake work of that kind?—A. Rather the directors of the district bank.

Q. Another case of the work falling back on one man?—A. Yes, there are not sufficient number of workers, missionaries, I mean.

Q. Work of this kind is commonly done in England on an enormous scale. Is there no way of infusing a better spirit into the leading people of the district?—A. I think so. Some people are coming forward. Now the work does not fall on one man only.

Q. We have had a lot of advice as to what the Government ought to do, but very little as to what the better class of people ought to do in helping their poorer neighbours?—A. They must do their share; that is what I have stated.

Q. This Provincial Board that you refer to, consisting of 3 or 4 officials and about 5 non-officials: you say that "5 or 6 non-officials from the combined province won't be able to deal with industrial problems concerning the province." If you had a larger Board I suppose it would be difficult to get that Board together frequently; but would you not obtain just the same kind of result if you allowed the Director of Industries a free hand, and then gathered together, not a Board, but something of the nature of a Conference, say 40 or 50 leading people from different parts of the province, at the end of the year, to discuss the Director's Report, and to consider with him the way in which he might have done the work, and put before him suggestions for the following year? Don't you think that would be better than having a large Board of Industries which would be representative of the province, but could not work efficiently because of its size?—A. That is not my point. Even if the Board were to consist of, say, 40 or 50 members, I don't think any useful purpose could be served. What is wanted are local

committees. The Provincial Board might consist of a select few, but it is impossible for them to go round the whole province and collect information. My point is that they must be assisted by a number of district committees. In that way we might get a larger number of people.

Q. Still if you had a large number of district committees they would all be able to send in suggestions to the Director of Industries to act on, and at the end of the year would it not be a good thing to gather together representatives, so that each could help the other with suggestions?—*A.* Yes.

Q. You would prefer then a Director of Industries acting alone at head-quarters, but at the same time a number of district committees to be formed also. Do you think that any advantage would be gained if these district committees met together in general committee? Or at least their representatives might meet together.—*A.* It would certainly be an advantage.

Q. You would like me to put that proposal before Mr. Leftwich for consideration when he comes before us?—*A.* That suggestion is already before him, forwarded by the Local Government.

Q. In what form is it before the Local Government; in the form of district committees?—*A.* Yes.

Q. And nothing else? You did not make any suggestions as to how these district committees should be linked up?—*A.* The district committees should be formed in districts themselves and should send their representatives to work on Provincial Boards.

Q. These two rivers you refer to, in the Balaghat District, which can give a certain amount of hydro-electric power, are they in full flow throughout the whole year, or in flood only during the monsoons?—*A.* They flood through the monsoons, but their flow is throughout the year.

Q. Their dry-weather streams are comparatively small?—*A.* Not of the Nahara, but the Uskal.

Q. Would there be any suitable place for damming the water and forming reservoirs?—*A.* Some enquiry was made on that point.

Mr. C. E. Low.—Q. How many industrial co-operative societies have you in Balaghat?—*A.* Three, one at Hatta and two in the Katangi circle.

Q. Do you find that, so far as the work went, there was any tangible benefit to these men by getting cheap credits and getting cheap yarn?—*A.* In the beginning it was and they made some profit out of it.

Q. As things went on, they apparently got slack about their payments?—*A.* Yes.

Q. Have you any knowledge of what is happening in the adjoining district of Bhandara?—*A.* Yes, there also the complaint is the same as in Balaghat; they are not doing well. They are in arrears; payments have to be suspended. They could not get a market in Berar.

Q. It is the case, isn't it, that at the outbreak of war, and just before, there was an extraordinary difficulty in selling goods?—*A.* Yes.

Q. Do you think that affected the societies at that time giving them a wrong turn; do you think it led them to get slack in payment?—*A.* They did not become slack, but they could not pull on with the business. They could not pay. They were working all right, but had no custom for their cloth. There was no demand for their materials.

Q. Your view seems to be that unless you can arrange to finance their goods and stock and sell them for them, these societies could never be a real success?—*A.* You must make one more arrangement; you must clear off all their old debts, otherwise it would be impossible to help these people.

Q. Your experience in that direction was in the first instance, with agricultural societies; how did you help them, by meeting their current necessities, or by paying their old debts?—*A.* Now I have made it a point, when I want to organise societies, I recommend that all old debts must be wiped off at once, otherwise I don't organise or recommend societies for registration.

Q. You were afraid to do it at first?—*A.* Yes.

Q. What difference do you find it makes to the working of the society, and to the condition of the men; do you find they are more truly co-operative, more punctual in

payment?—A. Yes, they are. I will tell you one or two cases—we advanced them money at low rates of interest. They prepare some yarn or cloth, and that is attached by another creditor.

President.—Q. It makes a difference to the man's spirit if he feels he is out of debt?—A. Yes.

Mr. C. E. Low.—Q. Have you any idea on the subject of technical assistance to weavers; have you seen anything of the work of the textile experts?—A. Yes, some looms were sent to Kamptee and brought to the Nagpur Exhibition.

Q. With what results?—A. They took to it; they liked it very much.

Q. You are speaking of the weavers in the Katangi society?—A. Yes.

Q. Have any of them come back using the fly-shuttle?—A. No. The Katangi people are not using it. They are Mahars by caste.

Q. The Bhandara people are using it?—A. Yes.

Q. You are a member of the Central Provinces Board of Industries I am told so, but I don't know. Since when?—A. About a month ago.

Q. Were you recently elected?—A. Recently nominated; at least I was told that I would be nominated.

Q. You say that the district association, which you originally formed, was started with the object of pushing the cause of industrial education, imparting technical, industrial, mechanical and special craft education, and to help the boys with funds. Don't you think it is a mistake to have the same society doing such entirely different things?—A. I think for technical purposes there must be a separate society.

Q. Is it not your experience that the more you narrow down the problems the greater the interest taken by members?—A. Yes.

Q. Have you an agricultural association in Balaghat?—A. Yes, two, one in each tahsil now.

Q. They are concentrating their attention on certain definite problems?—A. Yes, agricultural problems.

Hon'ble Pandit M. M. Malaviya.—Q. You say that the essential thing needed for the development of industries is that a sufficient amount of technical and expert knowledge should be created in the country. Towards that end you recommend that there should be industrial schools established. You also say that "at present the general policy is to bring experts from outside to investigate the possibilities of industries. This policy may be replaced by training Indians either in this country or elsewhere to qualify themselves as experts to undertake investigations." You are aware of the system of scholarships which is in vogue. Have you any special recommendations to make as to how these may be utilised?—A. They must be put on some work. They get the scholarship all right, but as soon as they come back, they do not find any employment here. They must be put on to some work.

Q. You recommend that "Government should use its influence over mill or factory owners to take up and train apprentices." What kind of influence? Do you mean to say that when Government patronises any firm or industry or factory, it should insist upon some student receiving training there?—A. Not necessarily that; even if Government does not patronise any factory, if Government uses its moral influence it would be enough. In our Balaghat association a recommendation from the Commissioner of the Division was quite sufficient to induce mill-owners to take up our apprentices.

Q. You mean the moral influence of the Government should be exercised?—A. Yes, that I think would be quite enough.

Q. You have a science college here at present?—A. Yes.

Q. Does it teach only theoretical science or applied science also?—A. I don't know much about that.

Q. You are not familiar with the syllabus prescribed?—A. No.

Q. If applied science were made one of the subjects in the syllabus, do you think it will attract many students at present?—A. I don't know if it would attract many students, but it will attract some students.

Q. You have no college of engineering here ; you draw your engineers from Roorkee ?—
A. Yes, from the higher grade.

Q. But you have got a school of engineering?—*A.* Yes.

Q. How far does it teach?—*A.* I think up to the sub-overseer's class.

Q. Have you got many men here who have returned from England after receiving technical education there?—*A.* Not many; about five or six that I know of.

Q. Are they busy with some industries?—*A.* Independent industries you mean? I don't think they have taken up independent industries.

Q. Have they found work as technically trained men?—*A.* They have found work, but not to their satisfaction.

Q. What is the complaint?—*A.* They have been working in some subordinate position in some of the mills here.

Q. They have not risen to the higher appointments?—*A.* No.

Q. Would this not come after they have gained a little more experience and proved their worth better?—*A.* Provided they are given opportunities for learning the higher kind of work.

Q. Is it their complaint that they do not get opportunities for qualifying themselves for the higher kind of work?—*A.* Yes, that is their complaint.

President.—Q. What mill are you referring to?—*A.* One is at Bullub Das's Cotton Mill, and one is working at the Balasher Coal Fields.

Hon'ble Pandit M. M. Malaviya.—Q. Did both these gentlemen receive their technical education in England?—*A.* Yes, for some time, they were working here, and got Government of India scholarships, and on their return were employed in the above business.

Q. Was the gentleman, who is working at Jubbulpore, trained as a weaving expert?—*A.* Yes.

Q. And the other gentleman?—*A.* He was a mining engineer.

Q. What is the present position?—*A.* Assistant manager.

Q. How long has he been there?—*A.* On his return from England; he told me at that time he was there nearly four years.

President.—Q. Do you remember his name?—*A.* I don't remember his name.

Q. I know all these mining students, and would like to know his name?—*A.* He is a local man, a Teli by caste.

Hon'ble Pandit M. M. Malaviya.—Q. You do not know more details about him?—*A.* No.

President.—Q. This is an Indian mill in Jubbulpore, entirely managed and run by Indians?—*A.* Yes. The student's name is Baliram Pandurang.

Hon'ble Pandit M. M. Malaviya.—Q. Who is the manager of the mill at Jubbulpore?—*A.* The present Manager is some European, Mr. Wright, I think.

Q. You think, therefore, that this Industrial Department which you recommend, will find more employment for men who have been technically trained?—*A.* Yes, that is one of the means.

Q. You say that "concerns, if investigated, financed, and for some time even managed by Government, would have considerable educative value, and would, in addition to the Government department, throw a wider scope for employment to a large number of Indians." Supposing the Government or Department of Industries investigated possible commercial problems and published the result, will not that by itself lend a great stimulus to industrial enterprise?—*A.* I don't think it will give the necessary stimulus; it may give some stimulus.

Q. Do you think if banks supported by Government were created to help industrial enterprise, this stimulus, added to that of published information in regard to possible industries, will supply sufficient stimulus?—*A.* Then it will be direct assistance from Government.

Q. A bank supported by Government to lend money to industrial enterprises and a Government department to publish information about possible enterprises and to lend other assistance?—*A.* The two together will certainly supply sufficient stimulus.

Q. Then the Government need not manage any concern itself.—*A.* No, it need not manage it itself.

Q. You say here, with reference to the Government guarantee of purchase of products, "In my opinion the time has not come and may not come for long, to lay down any limit to this form of Government aid. In my opinion the Government should patronise local products in preference to imported articles, in spite of some additional cost." You know the present rules lay down that local products should be patronised if they are fairly good and their price is reasonable. You think it is necessary, in view of present industrial conditions in India, that Government should give preference to articles produced in the country, even if the cost is somewhat higher than that of the articles imported?—*A.* Yes.

Q. How would the public be benefited by it?—*A.* They won't be benefited immediately, but in the end.

Q. You think it would promote the general object for which the Government exists, namely, the prosperity of the people?—*A.* Yes.

President.—Q. What limit are you going to put in the way of sponging? You cannot possibly put that on record unless you have some definite rule to assist Government. The actual rule is that all articles produced in India, in the form of raw materials, or manufactured in India from materials produced in India, should, by preference be purchased, provided the quality is good and the price not unfavourable. If you go beyond that, we must have something very definite to go on, as to what allowance we are going to make?—*A.* (No answer).

Hon'ble Pandit M. M. Malaviya.—Q. Will you help us with your opinion on this point? Suppose you find that an article produced in India costs the Government a little more than a similar article imported from Japan or America, could you indicate any definite percentage of difference?—*A.* It is very difficult to lay down a hard-and-fast rule.

President.—Q. If you cannot lay down any hard-and-fast rule, then no rule can be laid down at all?—*A.* (No answer.)

Hon'ble Pandit M. M. Malaviya.—Q. The Government have laid down a sound liberal policy that preference should be given to local products, but we know that, in spite of it and in spite of the presence of valuable sound material produced in the country, preference is given to articles produced outside; what would you suggest to ensure that the spirit of the rule shall be respected and not infringed?—*A.* The strict orders of the Local Government and every contract must be checked by the Director of Industries or some such officer. For instance, if the Public Works Department require any glasses or tumblers for their inspection bungalows, a large order is given to one firm. Such orders should be given to the Director of Industries, who would then advise, "here is a local industry, say the Jubbulpore factory; give preference to that factory; send all your orders to that factory."

President.—I would not like to be a candidate for your job of Director of Industries!

Hon'ble Pandit M. M. Malaviya.—Q. Please confine yourself to the rule which the Government have already laid down, that preference shall be given to indigenous products when the quality is sufficiently good for the purpose and the price not unfavourable?—*A.* Yes as far as I understand that rule it must be divided into two parts; first of all, it must be interpreted to give preference to local products. For instance, if there is competition between Madras and the Central Provinces products, that rule should be interpreted in favour of the Central Provinces product, but if there is competition between an Indian and a foreign product, then preference must be given to the Indian product. That is how I should interpret that rule.

President.—Q. You suggested just now that we should give a higher price for an Indian article; what rule would you lay down; would you lay down the percentage of price?—*A.* It is very difficult to lay down a hard-and-fast rule fixing the percentage.

Hon'ble Sir R. N. Mookerjee.—Q. Can you cite any instance where Government has not upheld that rule?—*A.* (No answer).

Hon'ble Pandit M. M. Malaviya.—Q. Have you any case within your knowledge where this rule laid down by Government has not been followed?—*A.* Yes, I know of one case, where all these tumblers and glasses required by inspection bungalows and dak bungalows are not taken from the glass factory at Jubbulpore.

Hon'ble Sir R. N. Mookerjee.—*Q.* Where were they taken from?—*A.* From Madras.

That is local.

President.—*Q.* You give instances of the first category. Have you any knowledge of cases of the second category?—*A.* No.

Hon'ble Sir R. N. Mookerjee.—That complaint then vanishes.

President.—*Q.* This rule bears on India *versus* the rest of the world; not one province against another. This rule does not recognise any provincial patronage?—*A.* Personally I would like to interpret it in that way.

Hon'ble Pandit M. M. Malaviya.—*Q.* Now infixing the price, in considering whether, in spite of some additional cost, the Government should or should not give preference to indigenous articles, the first thing the Government will have to bear in mind is that the cost of the indigenous article should not be very high, in view of the interests of the general tax-payer; will you recommend that officers of Government should bear in mind that manufacturers outside have had a longer innings, have had a long-established organisation and are able, therefore, to produce articles at a comparatively cheaper cost than Indian and also that possibly by reason of the profits they have made for a long time, they are able to reduce their prices for the time, if there is any indigenous product to compete with it. Would you recommend that Government officers should take these factors into consideration in determining to what extent they should show preference to goods of higher price?—*A.* I think so, because foreign articles should not be allowed to kill indigenous industries.

Q. You think then that more of Government patronage is essential in order to protect nascent industries in India against foreign competition?—*A.* I think so.

Hon'ble Sir R. N. Mookerjee.—*Q.* For a number of years or everlastingly?—*A.* I could not say that.

Hon'ble Pandit M. M. Malaviya.—*Q.* I have used the word "nascent." I take it that that should be shown only for a certain number of years, in order to give a fair chance to industries of establishing themselves, if an industry is not established within a reasonable period, you would wish Government to withdraw its patronage?—*A.* (No answer.)

President.—*Q.* This discussion is quite theoretical. We know the rule is not carried out, for very good reasons. One is that the responsible officer does not wish to take upon himself the responsibility of purchasing when you have the Stores Department who will take that responsibility. If you are buying a big piece of plant, and have only one year to run in office, your successor may say that you have purchased a bad piece of plant. You have the Stores Department upon whom responsibility rests. Another reason is that the responsible officer does not always know where to get these materials in India, and does not know if they will be of the right quality. He is already overloaded with work, and it would be easier for him to send the indent home, where the work will be inspected. It is no use our harping on this rule if we cannot get the rule carried out?—*A.* Every officer of Government should be supplied with a list of goods to be found locally.

Q. Do you think that we might have a list of articles published each year? In practice that has been found impracticable. It takes a long time to publish this list, and it comes out too late. We have had suggested to us another proposal, that in India should be formed a Stores Department similar to the Stores Department of the India Office, and that these orders should go into the Central Stores Department so as to get the benefit of contract prices. They would have a staff who would make it their duty to find out where goods are to be obtained, inspect the goods and take the responsibility. Does that appeal to you?—*A.* It appeals to me, but I cannot say about its practicability. It seems to be a very good suggestion.

Hon'ble Pandit M. M. Malaviya.—*Q.* If a Stores Department, like what has been suggested to you, is established, would you wish to have one for every province, or one for the whole of India, in view of the problems that have to be tackled?—*A.* I have not thought out this problem.

Q. You say here, "The policy of revising the assessment of land revenue during the currency of the term of settlement, if the land is diverted from agricultural to non-agricultural purposes, or of taking premium on such conversion, may be very sparingly used, or not used at all. Generally the settlement of such land should be for a much longer period than the one of land used for agricultural purposes." Is that the regular practice here at present, that if land which was purchased for agricultural purposes

is diverted to non-agricultural purposes, then there is a revision of the settlement during the period of the previous settlement?—*A.* I have stated in my evidence that under the law as it now stands, it is not possible to do it, but under the law under amendment, it will be possible.

Q. Then from your point of view it is a wrong departure from a good policy?—*A.* Yes.

Q. If the law is passed?—*A.* Yes.

Q. If land is diverted from agricultural to non-agricultural purposes, *i. e.*, let us confine ourselves to industrial enterprises, then the industry that might grow thereon would probably contribute a tax in the shape of income tax, and you think that would be sufficient reason for not revising the land assessment during the period of settlement?—*A.* Yes.

Q. You say, with regard to the instructions for the guidance of Settlement Officers, that "such instructions, so far as one can judge, are issued mainly with a view to safeguard or increase public revenue, and that as far as one can judge in all these instructions, due regard does not appear to have been given to the development of the industries." That may be due to the fact that the Government of India had not decided what policy to pursue in regard to the development of industries? I understood from another witness that drawing was compulsory in your schools; here you say "drawing is not yet a compulsory subject."—*A.* Not in the Central Provinces to my knowledge.

Q. You are firmly of opinion that drawing and manual work should be compulsory?—*A.* Yes.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. About these district committees how many men do you want on these committees; do you want them from different villages or from a central district town?—*A.* If you get men from villages that would be an ideal district committee.

Q. What do you think ought to be the number of the committee?—*A.* As many workers as there are. I would not lay down any number.—If you can get 20 men it would work.

Q. Meeting every month?—*A.* Not necessarily; once in three or four months.

Q. Who are these people to consist of; businessmen or men who have got experience?—*A.* Businessmen and men of the district who have experience.

Q. And they may be subordinate to the Provincial Board?—*A.* Yes, or they may be co-operators of the Provincial Board, if they do not like the word "subordinate" to be used.

Q. But they would work under the advice of the Provincial Board?—*A.* Yes.

Q. At present this Board of Industries is under the Director of Industries, or under Government?—*A.* It is nominated by Government.

Q. And so it is under Government?—*A.* I don't understand what you mean by "under Government".

Q. Or under the Director of Industries. Suppose there is a problem brought before him; should they advise Government or can they only advise the Director of Industries?—*A.* Advise Government through the Director of Industries.

Q. Are their opinions laid before Government or before the Director of Industries?—*A.* Before the Director of Industries. They are placed before a meeting which is presided over by the Director of Industries, and all the proceedings are forwarded to the Government. He is one of the members of the Board.

Q. Then about the land acquisition, suppose if the land is required for a bamboo plantation for the wood pulp industry, and suppose that 5,000 acres of land are needed by Government for this purpose in one plot not divided up, so that they can do it economically, do you think that Government should acquire these 5,000 acres of land through the Land Acquisition Act; do you mean that?—*A.* Yes.

Sir D. J. Tata.—Q. With reference to this complaint about the young men who have returned from England, and who, you say, cannot get sufficient opportunities, do you think it is a real grievance? Does the fault lie entirely with the employers? Do you think that the young men themselves are everything that they should be?—*A.* I cannot say, but the fact remains that they don't get employment.

Q. You have just now told us that some of these men, whom your association sent, refused to do manual work in the mines because they were expected to work as labourers for two years, and that they left because they were not taught the theoretical

work at once. A good many of these young men—very estimable young men no doubt—who leave their country to try and learn new industries, go out, but don't you think they only acquire the theoretical knowledge required for that purpose, and that their practical knowledge is actually nil, and if when they return from Europe they expect to be employed as you say in managerial positions, how could any concern employ them as such when they have no faith in their ability to do practical work?—A. I am told they get some practical training, and even then find difficulty to get employment on their return.

Q. Is the practical training of such a nature as to satisfy the employer in this country?—A. I am not in a position to give an opinion on that just now.

Q. You will find, on enquiry, that nearly every man who occupies a high post in industrial concerns, however great may be his theoretical knowledge of the subject, has always worked practically as a labourer for a long time before he can be fitted to do any work. Don't you think, therefore, that if our young men reconciled themselves to this idea more, they would do themselves and the country more good?—A. I quite agree with you there.

Q. You said something about these men not getting opportunities; but don't you think that a man who is really serious should make his own opportunities, and should not wait for them?—A. The theory may sound well.

Q. Naturally in practice what happens is this. A young man goes out to Europe either, with a scholarship or with money borrowed, or on a small allowance his people may make. He spends sometime in Europe to acquire the knowledge of an industry or trade, and he expects to begin to earn as soon as he returns. That is the real grievance, because the people are too poor. But at the same time, if, after he returns to the country, and goes into an industry, he devotes the first two or three years to beginning at the bottom of the ladder, don't you think he will arrive at the top quicker than if he went straight off to jump into management?—A. I don't say he should be appointed manager at once.

Q. You said that some of the people who returned complained that they had not got into high posts; how long have they been in this country?—A. I have cited two instances. I know they have been in the country five or six years after returning from England.

Q. Do you expect that in any industry, after he has begun his work, anyone could rise to high posts in five or six years?—A. At least he must have hope of rising.

Q. Personally I should say it would be 15 or 20 years before a man can be head of an industry?—A. Personally I think you cannot expect so much patience from an Indian.

Q. Then you expect them to rise?—A. That is what I say; there must be some limit to it.

Hon'ble Sir R. N. Mookerjee.—Q. Is this association at Balaghat a registered association?—A. No.

Q. What is the qualification of the members of the association; do they subscribe any money?—A. Yes.

Q. What is the number of the members?—A. I could not tell you just now.

Q. What is the fund available to the hands of the association?—A. Some thousands, I think, I don't remember the exact amount just now.

Q. You don't know what is the qualification; is there any limit of subscription?—A. Persons who pay Rs. 200 are called patrons, and those who pay monthly subscriptions are called donors. We have got funds and have expended some money out of that.

Q. Can you give us any idea of how much you have expended?—A. We built hovels for the boys in the Peench fields. I have not got the details here.

Q. It is not registered?—A. No.

Q. Don't you think that, as you have public funds, it would give more confidence to the public if you had it registered?—A. Yes.

Mr. A. Chatterton.—Q. You say you have had no difficulty in securing money for business, and that land tenures in these provinces do not afford sufficient security to the investing public. Then you go on to say, "If the recommendations made by the

MacLagan Committee are accepted, that difficulty would disappear." What difficulty are you referring to?—A. The co-operative banks, I think. The recommendations made by the MacLagan Committee are that land transfers should be made in favour of co-operative societies.

Q. What I understand from this is that the land at present does not afford sufficient security to the investing public, and that if these recommendations are carried out, land would have a greater value, and therefore people would invest their money in land instead of business propositions?—A. Nine-tenths of the members we have dealing with have no transferable interests in the land they hold.

Q. You want their land as security for the money advanced?—A. Yes.

Q. Why do you say that the land tenures do not afford sufficient security; simply because they are not transferable, or because of the short-time settlements?—A. Because they are not transferable. The short-time question has not got anything to do with it.

Q. On the same point of land policy, I understand there is a good deal of discussion. It is proposed to review the settlement. If the land is transferred from agricultural to the non-agricultural purposes, is that with the view to securing the unearned increments?—A. Yes.

President.—Q. Can you tell us, approximately, what your annual turnover is in connection with the co-operative societies in the Balaghat district?—A. About 7 lakhs. More than nine-tenths is in respect to agriculture.

Q. At what rate of interest is your money with the co-operative bank for industrial purposes?—A. We have only one rate of interest, 12 per cent. We get money from deposits at 6 per cent to 6½ per cent, according to the term of notice. When we have occasionally to borrow money from the Provincial Bank, we get loans at 7 per cent.

Q. Hon'ble Sir Fazulbhoy Currimbhoy.—And you give at 12 per cent?—A. We don't deal with individual members; we deal with societies.

Q. Hon'ble Sir R. N. Mookerjee.—What is your present capital?—A.—Our working capital is about Rs. 3,80,000.

WITNESS NO. 140.

Rao Saheb G. N. Sahasrabudhe, Pleader, Ellichpur, Berar.

Written Evidence.

Industrial
research institutes.

At present I am interesting myself in the manufacture of paper and pulp from green cotton stalks which are abundant in the Central Provinces and Berar. I am indebted to Mr. Leftwich, Director of Agriculture and Industries, and Mr. Plymen, the Agricultural Chemist, for investigations on the raw material. A bundle of stalks was sent by me for investigation and demonstrating the manufacture of paper from them. The report of the Agricultural Chemist has been published. I wish to take the matter further and see whether the enterprise will be commercially successful. Mr. Plymen has promised to enlighten me further and give me the opinions of firms regarding its use on a commercial scale. He has already sent me a letter giving the estimates of the capital required to produce 300 tons per week of unbleached pulp made by Messrs. Bertrams, Ltd., of Edinburgh. Further enquiries are being made by me. But before the industry is started it must be satisfactorily proved that the concern will be profitable. The idea is to start a pulp factory to begin with. If the enterprise proves commercially successful and feasible, a company in the Central Provinces and Berar will be ready to undertake the manufacture of pulp with Government help and to learn the process of manufacture. We shall have therefore to see whether there are facilities provided in the country (1) for learning the process of manufacture of pulp and paper from cotton stalks, (2) for investigating on the raw material and proving that paper and pulp can be manufactured, and (3) for demonstrating to the public the feasibility of the concern on a commercial scale.

There is a small research institute and laboratory at Nagpur, but it will be occupied with agricultural experiments and will be unable to experiment upon industrial products. The research institute at Pusa will also be occupied with agricultural research work. The research institute at Dehra Dun experiments upon forest products, and I doubt whether it will find time to do the industrial research work. Provision under this head seems therefore necessary. There is also no institute in the country to train the apprentices in the various processes of manufacture of various articles and to demonstrate the practicability of the enterprise on a commercial scale. I am experiencing a practical difficulty at present in this respect.

I had a considerable correspondence on the subject with research institutes and Government departments in the country and with private paper mills in India, and from the replies received it seems that no provision is made to train apprentices in the process.

of manufacture of various industries. The country is in need of experts and scientists and skilled labourers, and, unless they are produced, there is not much hope of advancing the industrial development of India.

As for my experience of Ellichpur Match Factory, I beg to state that we had to face many difficulties. A note on the Ellichpur Match Factory is annexed. The causes of the failure of the concern are many and varied, but chief amongst them are:—

- (1) unsuitability and insufficiency of the raw material *salai*;
- (2) want of expert knowledge;
- (3) want of expert aid;
- (4) insufficiency of capital for working expenses;
- (5) want of skilled labour.

In the light of the above experience I submit the following suggestions for the consideration of the Commission.

I would suggest the establishment of a separate Imperial industrial scientific and technical department at Allahabad or Cawnpore, controlled by a Board of Industry, on the lines on which Boards of Forestry and Agriculture are established. The Board should consist of officials and non-officials nominated by the Government of India. A new officer, named "Director-General of Industries," should be appointed on an attractive salary, helped by the above Board and also by a qualified Indian secretary having sufficient knowledge of industries and their organization, also appointed on a good salary. An industrial research institute and industrial laboratory should be attached to the department, manned with a competent staff of experts and investigators who should be able to experiment upon raw products and to demonstrate the practicability of the concern.

Investigation of major problems should also be made in the research institute. The Board should co-operate with the department in England and should carry on correspondence or personally go to England and utilise the research institute and Advisory Board of Scientists in England when it is absolutely necessary to do so.

The Board should have executive power with budgeted funds at their disposal. A provision should be made in the Indian Imperial Budget under the head "Development of Industries." Provincial Directors of Industries should receive advice from this Imperial Industrial Board. Annual meetings of the Board should be held, when all Provincial Directors and Industrial Chemists should attend and the Director-General of Industries should preside at the meetings. A triennial programme of work should be discussed and sanctioned just as is done in the case of Boards of Forestry and Agriculture, the questions being decided by a majority of votes. The proceedings of the meetings should be published for the information of the public concerned. The Government of India should have controlling and revisionary powers over the Board, and their orders should be final.

The industrial research institute would demonstrate the utility of certain raw material for a market product used by people in their ordinary course of business. A further stage is to see whether the experience will be successful on a commercial scale, and I humbly think it forms part of Government duty to get an investigation made as to the probability of the success of new industries. To meet this want I would suggest that the Government should establish pioneer or model factories for manufacturing a certain article—say paper pulp from green cotton stalks—on a commercial scale (in which I am interested) in a place where the raw material is abundant: in my case, say, at Wardha in the Central Provinces or Murtizapur in Berar. The Government should run the factory, say, for one or two years, and when it is proved that the concern is successful and profitable, any company in Central Provinces and Berar may—and in my case a company will be ready—purchase the concern at a cash price and run the factory on the lines demonstrated by Government. This model factory will be a training school to learn the actual process of manufacture as well as to train labourers and thus create a competent class of skilled workmen in a particular industry. I also venture to suggest that when handing over the concern to a new company, or when any financial assistance is given by Government to a company, a condition should be attached to the effect that the promoters of the company should undertake to teach one or two apprentices the actual process of manufacture. Apprentices will thus have some facility provided to learn the actual process of manufacture either in the Government model factory or in the factory purchased by a company. The details of the scheme may be worked out later on. I know that it will be next to impossible to start model factories for numerous industries. But I suggest that such a model factory may be established only when the demand for a particular industry arises, or when the initiation comes from the people themselves, as in my case of paper manufacture, the initiation will come from the people. This scheme is feasible and there should be no difficulty in sanctioning it.

Model factories.

Official organization.

As regards the official organization of the Central Provinces and Berar, I beg to state that there should be a Board of Industry (not advisory) consisting of officials and non-officials nominated by Government with executive powers and with budgeted funds at their disposal. A provision should be made in the provincial budget under the head "Development of Industries." The Board should be helped by a qualified Indian secretary possessing practical knowledge of industries and their organization and business abilities appointed on an attractive salary. There should be a small industrial laboratory and research institute attached to the Board equipped with a good industrial chemist and a staff. Small and major problems of the province should be investigated in the laboratory. Annual meetings of the Board should be held at which the Director of Industries and Agriculture should preside. Questions should be decided by a majority of votes, the President having a casting vote. The proceedings of the meeting should be published for the information of the public concerned, along with the annual report showing the progress made during the year. The Board should carry out the problems and orders of the Imperial Industrial Board and should co-operate with the latter. The Board should also look after the development of small industries as well as big industries in the province and carry out the scheme that will be sanctioned by the Commission and by Local Government. The orders and resolutions of the Board should be subject to the revision and control of the Local Government, whose orders will be final.

Institute of Science, Bangalore.

The Institute should be fully developed, unless it is completely specialized, say, for iron and steel. Research and laboratory work should be carried on here in connection with industries, the raw materials of which are abundant in southern India. It should be an Imperial institute. It should be general in activities and interests for the present. The scientific and technical experts of Government and this institute may be encouraged to study methods in foreign countries. The Government of India should exercise control over the Bangalore Institute and see that it actually serves the purpose for which it was intended by the donor. The results of the Research Institute at Cawnpore and Bangalore should be published by Government for general information along with the annual reports summarising the work done during the year. No restrictions or conditions should be placed in the matter.

Technical aid.

The Government should entertain a good staff of experts in various industries, as demand arises, such as (1) match, (2) sugar, (3) paper, (4) tanning, (5) oil-refining, etc., etc. The experts may be given on loan to private firms or deputed on applications, on conditions which will not act harshly on promoters of a company. The periods of loan may be extended if necessary. In the case of the Ellichpur match concern such expert aid would have been a boon to the company. Chemical treatment of match-heads was found defective and the matches would not ignite in the rainy season, with the result that the matches and the match boxes were simply lying idle for want of custom, which partially accounts for the failure of the concern.

The salai wood was found useless, as it could not be split evenly. The result was that heaps of broken splints were lying in the compound of the factory unutilised for want of expert knowledge. Now it is said that these waste splints could have been used and turned into bricks for flooring. What is really wanted is that the Government should have at their disposal various expert advisers for advice in various industries. The object is to build up an industry at an early stage by Government help, leaving further development with managers.

Government assistance.

Government aid to industrial concerns can take one or more of the following forms:—(1) direct financial aid in the form of bounty or subsidy for a specific or general purpose; (2) indirect financial aid in the form of commissions as regards railway freights; (3) supply of raw materials from Government without charging royalty or any other tax; (4) experimentation with a view to testing or improving certain processes of manufacture from various points of view, and especially chemical or economical view point. Looking to the backward state of the country, all methods are welcome. But (1) guaranteeing payment of interest without subsequent refund of expenditure incurred for paying dividend, (2) loans with interest at a cheap rate, just like *tagai* system, (3) supply of machinery and plant on hire-purchase system, (4) guaranteed Government purchase of products permanently or at least for a certain period until credit is established, (5) assistance through State banks, (6) State patronage and facilities of transport, and (7) finding markets for indigenous products, are methods which will most appeal to people. Money grants, bounties, and subsidies may be given in the case of some industries with great scrutiny. The matter should be decided on the merits of each case.

My experience is that Government control is absolutely necessary for the satisfactory working of a factory; when any direct or indirect aid is given by Government, Government control should, in my opinion, be confined to a general audit of accounts, keeping a strict watch over the monthly statement of profit and loss. Any defects in the accounts should be at once brought to the notice of directors and should be removed immediately.

Pioneer factories.

Pioneered concerns should be treated and managed just like other departments of Government. A balance sheet and statement of profit and loss should be published at the end of the year. If the concern is a profitable one, people will come forward and purchase it.

I am against the principle of converting pioneer factories into permanent Government institutions. It is something like Government interference with trade and commerce of the people. In war times and in the case of concerns on the largest scale only Government may pioneer industries; for instance, munition factories in war times.

I think it is necessary to establish industrial banks supported and financed by Government in a central place in the country, the branches of which shall be opened in each presidency or provincial town of India. They should be supplied with expert managers, who should be in a position to work on both the industrial and the commercial side of the institute. Advance of loans at a cheap rate of interest will be welcomed by proprietors of small and big industries in the country, many of which will be saved by timely help from these banks. In the case of the Ellichpur Match Factory we wanted money for working capital and we had to borrow it at a rate of interest not lower than one per cent per month.

I have got no experience of co-operative societies helping any industrial concerns. But there are some societies in the Central Provinces and in the Bombay Presidency which assist small industrialists and cotton and silk weavers.

I have got a bitter experience of unskilled labour in the Ellichpur Match Factory. The match industry is already an intricate industry, and skilled labour is absolutely necessary for the successful working of the factory. To work on the machines requires training. We had to suffer a considerable loss for want of skilled workmen. We had to import experienced labourers from Ahmedabad at a considerable cost. The work of filling boxes with matches is generally done by female labourers; on this side of India there are no skilled male and female labourers at all. Whereas in Japan a female labourer can fill up 2,000 boxes in a day, the Indian woman can scarcely fill up 500 boxes in a day. If my memory is correct, there were only one or two girls in the lot who filled up 1,200 boxes in a day of 10 hours. In consequence the factory had to suffer considerable losses.

An Indian workman is intelligent, but he requires training and good prospects before him. He does not take interest in his work and is unmindful of its details, probably for want of encouragement and facilities in many directions. The proprietors of factories and even the promoters of the big cotton mills of Bombay have not yet provided full facilities for the comforts and education of the mill hands. The pressure of commercial competition forces managers to pay close attention to the market, and to a careful study of the machinery and plant. But no heed is paid to labourers, who are admitted to the factory as they come. But the time has now come and the business-world is now realising that, whether they desire it or not, the labour side of a big industrial concern calls for a large and continuous expenditure of brain-power on the part of some officer of a factory. It cannot be left to subordinates.

Labourers are human beings and they should be treated as human beings and not as imperfect machines. The managers should respect the industrial independence of the work-people. They should be treated not as mere work-people, but as citizens with their human hopes and aspirations and their own part to play in the life of a nation. The main spring of the policy of a factory manager should be a sense of social duty. The test of any scheme of factory organization is the extent to which it creates and fosters the atmosphere and spirit of co-operation and good-will among the work-people. The efficiency of the employes shows itself in many ways, the most striking being the elimination of waste and reduction of cost in various departments. The care for the physical efficiency of the worker forms an important factor in the industrial organization of a concern. It results in a decreased sickness rate and the higher physical fitness of work-people. To accomplish this purpose, the manager should adopt (1) a careful method of selection of the employes, (2) a scheme for educating them, (3) carefully thought-out methods of promotion, (4) just and fair discipline, (5) healthy and orderly house surroundings, (6) a system of bonuses, (7) recreation and sports clubs, (8) good, airy and decent houses, (9) kind and sympathetic treatment, (10) system of medical aid, (11) system of life insurance, and (12) opportunities for the development of the organizing ability and initiative of the workers.

The science of industrial organization is as yet in its infancy in India. The establishment of model factories by Government, organized on the system of the Bournville Works, will have a most encouraging effect on the people of the country. This should be the ideal of the Indian industrialists, and it is capable of attainment with Government assistance.

The Government departments should publish list of imported articles which are used by them and also exhibit them in commercial museums. The people of the country will then be in a position to know the nature of the articles purchased by them, their prices, and the make and finish of these articles. An Indian manufacturer will thus be in a position to manufacture similar articles in his factory and offer them for sale to the public and the Government.

Trade representatives should be appointed in foreign countries on behalf of India. They should be men of business and commercial instinct, and should try to create a demand for Indian articles in foreign countries and as well as study the taste of people and report on new methods and articles manufactured in Europe and America.

The demand for factory products is one of the main factors in the success of an industrial undertaking, and trade representatives or agents in India itself would be of much value if they will try to advertise and create custom for articles manufactured in factories.

Emporiums and museums, exhibitions in presidency towns and at local fairs, and establishment of sales agencies are the most important factors in the development of Indian industries.

Railway freights. Several witnesses have advocated a reduction of railway freights in India. I fully agree with them. I cite a particular instance of hardship entailed upon a big and distinguished firm at Bombay.

The complaint from the Alembic Chemical Works Company is as follows:—"We are liquor contractors to the Baroda Government and manufacturers of spirits, foreign liquor, etc., etc. We cannot receive proper supplies of mohada and coal in season due to shortage of wagons. We have tried many times in different directions; but we are neither given siding facilities, of which we are in great urgent need, nor does the railway company give us any concession in rates, although we are paying on an average about Rs. 10,000 per month in the shape of railway freights." The grievance complained of is worthy of relief. The only remedy, in my humble opinion, lies in the transfer of company management of railways to State management. There are many grievances of this nature in the country, and I earnestly request that the railway grievances should be removed as soon as possible. The correspondence will be shown at the time of examination.

Cottage industries. A considerable portion of the population of Central Provinces and Berar is engaged in carrying on small or cottage industries. Hundreds of thousands of people maintain themselves on the profits earned in these industries. Small industries play not an unimportant part in the industrial organization in the country, not only in India but even in England, France, Belgium, Switzerland and Holland and other countries. It has been conclusively proved with reference to small industries of the work that they can hold their own in competition with foreign-made articles manufactured by steam or electric power. These industries therefore deserve encouragement both from the Government and people.

The Hon'ble Mr. C. E. Low, I.C.S., has made good suggestions in his lucid report on the "Industrial Survey of Central Provinces and Berar," published in 1910. The Central Provinces Administration has approved the recommendations, which are being carried out gradually. Experts should be appointed to instruct apprentices in some of the small industries, *viz.*, (1) cotton and silk weaving, (2) dyeing, (3) toys, (4) brick and tile making, (5) glazed pottery, (6) oil-pressing, (7) brass, (8) embroidery, (9) bangle-making, (10) furniture-making, (11) carpentry and blacksmithy.

(2) A superintendent for each district should be appointed on a handsome salary, who should try to establish societies of co-operative credit and advance money to industrialists at a cheap rate of interest.

(3) Modern machine tools and plant should be supplied on the hire-purchase system and demonstration workshops should be opened in the head-quarters of a district or province.

(4) Sales agencies should be established, which should dispose of the goods prepared by the owners of the small industries.

(5) More industrial and handicrafts schools should be opened in the provinces in the Central Provinces and Berar, such as Jubbulpore, Wardha, Yeotmal, Akola and Ellichpur. Demonstration classes and workshops should be attached to them, wherein specialized instruction by experts should be given in the process of manufacture of various articles. People trained in these schools will be available to work in factories carried on by oil and steam engines, to make general repairs of machinery, etc., when required.

Match industry, Ellichpur. This is an industry of which I have got bitter experience. We had started, at Ellichpur (Berar), a company for manufacturing white phosphorus and safety matches, in 1906, on a share capital of one lakh of rupees. The whole amount was collected by shares and was spent in erecting an imposing building and the purchase of machinery from Germany. There was no working capital. We had to borrow it on interest. The factory went on working for nearly two years but yielded no profits, and at last the business of the company was wound up in 1910. The causes of the failure were, as usual, various and varied. Bad quality of the wood salai (*boswellia serrata*), lack of expert knowledge and skilled labour, want of capital and want of experience and business.

management,—these were the chief causes. I have suggested a scheme of establishing a saw mill and wood-cutting machinery at the foot of the Himalayas which abound in pine tree and other trees suitable for match industry. Logs of wood should then be floated down by water-ways, *vid.* Ganges river to a central railway station on the banks of the Ganges river. A splints factory should be established near this railway station to manufacture splints from the above logs of wood. These splints should then be imported to the internal plains where the match factories are already established.

This suggestion, if carried out, will be really a great boon to the people. Forest and railway concessions, a little expert advice to factory owners at times,—these are as necessary as the Government help in the matter. There are many small things needed to complete a match box which are required to be imported from foreign countries, and it is a problem how these small things can be manufactured in India. I think it is not possible to make the country self-contained in every respect, and we shall have to depend on foreign countries, especially for chemicals, unless the chemical industry is completely taken up by England.

The problem of finding suitable wood for match manufacture is a difficult one, and can be probably solved—at least partly though not wholly—by the adoption of the scheme proposed above, and by using pine trees which abound in the Himalayas and which is the most suitable wood for match manufacture. My experience shows that the salai wood, which was used by us at Ellichpur, is useless (and insufficient in quantity in the Melghat Forests) as it cannot be split evenly, with the natural result that there was great waste of wood and consequent loss to the company. Heaps of broken splints were lying in the compound, but for want of knowledge the waste could not be utilised to some other purpose. A knowledge of the utilisation of waste is absolutely necessary to the proprietor of an industry, and the Government should help the factory owners in this respect. We also experienced the chemical difficulty attending the treatment of match-heads, especially in the rainy season, which also accounted for the enormous loss sustained by the company. Laboratories and research institutes are, absolutely necessary for the practical training of the people. The Forest Department should make suitable arrangement for the supply of wood on reasonable terms. Railway freights should also be reduced to a considerable extent.

Oral Evidence, 15th December 1916.

President.—Q. I understand that you have taken an interest in paper pulp manufacture from cotton stalks. We are not experts in paper and so I expect that you would get more advice by placing your problem before an agricultural chemist or Mr. Leftwich who would put the matter before the right kind of people, or before Mr. Finlow?—*A.* I do not know whether Mr. Finlow has taken up the matter.

Q. Or any paper experts in Bengal? Have you sent any samples to Messrs. Bertrams, Limited, of Edinburgh to take an interest in the matter?—*A.* No. The first difficulty which I place before the Commission is that we want facilities for learning the process of manufacture, in the first place, in the country itself. For that reason I enquired at the Research Institute at Dehra Dun, at Pusa, at Nagpur and at Poona, and the replies which I have got from all these places seem to show that there are no facilities provided for teaching the process of manufacture. What I wish to impress upon the minds of the Commission is that these facilities should be provided in the country itself. Secondly, after having demonstrated that a certain article can be produced from a certain raw material, it remains to demonstrate whether the concern will be successful on a commercial scale or not. If these two points are accomplished, then I believe any company will come forward and take up the concern. As far as I see there is no facility provided in the country itself. If these two facilities are given in the country itself, then I think we shall be able to start an actually new manufacture of paper pulp in the Central Provinces and Berar, and so far as my enquiries with my friends are concerned, I feel sure that a company will come forward to undertake this new industry of paper pulp from cotton stalks. To demonstrate the practicability of the concern on a commercial scale model factories should be started by Government in a place where there is abundance of this material, either in Wardha in the Central Provinces or Murtizapur in Berar, and after experiments are made for two years by the Government, if it is proved that this factory could be carried on as a profitable concern, the concern would be purchased by a company with a price paid in cash and the matter would go on very easily.

Q. Have you formed a company?—*A.* I have not yet formed one. I have taken the sense of the people and I think they will form a company if it proves a successful concern. My bitter experience of the match factory at Ellichpur shows that I should not advise anybody to come forward in an undertaking of which they have no experience, and which it has not been proved in the country would be a successful concern. We lost Rs. 1,73,000 in the match factory. There is no use going on with any new concern unless one is satisfied that it will be a profitable concern. That is my conviction from experience. I advocate model factories in the Central Provinces and Berar.

Q. What makes you think that the Institute of Science at Bangalore may become specialised in iron and steel? What has that Institute got to do with iron and steel?—*A.* Because it is Tata's. Sir D. J. Tata may wish to use it for iron and steel.

Q. There is an extraordinary confusion of ideas; because the money was largely subscribed by the Tata family, it is thought that the Institute will have something to do with iron and steel?—*A.* My impression was wrong, it seems.

Mr. C. E. Low.—*A.* You speak of the Board of Industries as the provincial controlling authority for the improvement of industries. Will the Board control the ordinary work of the experts?—*A.* It should contain ordinary businessmen.

Q. You will have experts as well?—*A.* Yes. I propose an industrial chemist and experts, all attached to this Board.

Q. Experts in what?—*A.* Experts in the process of manufacture of any material.

Q. You will not be able to get an expert in the manufacture of everything?—*A.* Not in everything, but in a particular industry. In the Central Provinces and Berar, paper industry.

Q. You propose to start with an industrial chemist and an expert in making paper from cotton stalks?—*A.* Yes.

Q. Will the Board control the experts?—*A.* Yes.

Q. Would you find any difficulty in controlling the working of experts through the Board?—*A.* I have not got experience of that. I cannot say that.

Q. The non-officials would be, you say, businessmen?—*A.* Some of the officials would be businessmen also. The non-officials will be businessmen, or men interested in industrial concerns, or commercial business.

Q. You propose that annual meetings of the Board should be held. Do you propose that it should not meet more than once a year?—*A.* There will be a meeting once a year, but if necessary they may meet more often.

Q. They will have constantly to refer to experts for opinions, probably twice or thrice a week? Speaking from my experience as Ex-Director of Agriculture, I used to find that experts were referring to me several times a week?—*A.* They will not be in a position to meet once or twice a week. A certain period may be fixed at which these questions may be discussed.

Q. Turning to your match factory, there was a good deal of waste of wood in 1905 when I had the pleasure of visiting it then?—*A.* Yes.

Q. Do you remember how much of your wood you had to waste?—*A.* Out of one ton, one fourth was utilised and three-fourths were wasted.

Q. You were using salai wood for match heads and match boxes?—*A.* Yes.

Q. You had to get your salai from a considerable distance?—*A.* Yes, more than twenty miles. We had a concession from Government in that respect. We paid two annas a cart. The cultivators have to pay eight annas a cart.

Q. Do you think that if there was a Government expert his advice would have been freely available to you?—*A.* Yes. He would have been of great use.

Q. Do you think, looking back on it, with expert assistance you could have made it a success?—*A.* With expert assistance and capital we could have.

Q. Leaving the question of capital aside for a moment, do you think that with that wood you could have made matches to pay?—*A.* Yes.

Q. You had, of course, at that time a ready sale for all your products?—*A.* Yes.

Q. You sold them locally?—*A.* Yes.

Q. And you found that within a radius of 50 miles you could knock out any Japanese or other competition?—*A.* Yes. There was no complaint about the sale at all.

Q. Did you make experiments with any other kinds of wood?—*A.* There is only salai. There is no other wood available in that part.

Q. The Maharukha wood is very limited?—*A.* Yes. It grows round Ellichpur.

Q. After a few years' working you would come to the end of it?—*A.* Yes.

Hon'ble Pandit M. M. Malaviya.—*Q.* You refer to the correspondence on the subject with research institutes. Have you any objection to laying it before us?—*A.* No.

Q. So far as the enquiries have gone on, is it now established by Mr. Plymen's research that the raw material is suitable for producing paper?—*A.* Yes.

Q. You want the matter to be examined to see whether it will be commercially successful?—*A.* Yes. That is the stage at which we have now arrived.

Q. You say that if it is to be proved that it will be commercially successful you want the Government to start a demonstration factory?—*A.* Model factories. Without them capital would not come forward.

Q. Have you found out what capital would be necessary to start one?—*A.* Mr. Plymen referred the matter to Messrs. Bertrams, Limited, Edinburgh, and the estimate amounts to a total capital of £ 230,000 or Rs. 34,50,000. It is on a large scale, so that you may be able to produce 300 tons of pulp every week.

Q. You do not think that so much capital will be raised in the first instance unless the Government has demonstrated by a demonstration factory that the project will be successful?—*A.* No. I am quite sure of that.

Q. You suggest the establishment of a separate Imperial scientific and technical department at Allahabad or Cawnpore. Do you suggest one of these places because they are more central?—*A.* Yes.

Q. You say that there should be a qualified Indian secretary under the Director-General of Industries?—*A.* Yes.

Q. What are the advantages which you have in mind? Do you think he will be able to bring the Indian businessmen into closer touch with the department?—*A.* Yes. He will be the working man in the whole Board. He will take more interest in the matter.

Q. You do not think that it would be sufficient to have an Advisory Board of Industries?—*A.* No. It is no use.

Q. You think that the opinions of the Board should be binding upon the Director of Industries?—*A.* Yes.

Q. Do you think that businessmen are more likely to be attracted to the membership if their opinions are binding upon the Director than otherwise?—*A.* I think so.

Q. As regards your point about the Institute of Science, Bangalore, you think that the Government should take it over under their own control?—*A.* Yes, and give it an Imperial character. It should be developed properly so as to carry out the intentions of the original donor.

Q. What was the machinery that you had in this match factory? Was it German?—*A.* German. The whole thing was German. It cost about Rs. 50,000. It was very nice machinery.

Q. You have enumerated the various causes which led to its non-success. But among these causes which would you select as having contributed more than any other to its non-success?—*A.* Non-suitability of the wood and want of expert knowledge too.

Q. Want of proper knowledge on the part of managers?—*A.* Yes.

Q. You had no difficulty about capital?—*A.* We had to raise money for working capital at a high rate of interest.

Q. Do you mean that if you could raise capital at an easier rate you might not have come to grief?—*A.* Yes.

Q. You say, "The work of filling boxes with matches is generally done by female labourers; on this side of India there are no skilled male and female labourers at all." Are you not finding now that more and more boys and girls are going to some of the schools?—*A.* There might be some improvement. They are still inefficient, though cheaper.

Q. The cheapness is counterbalanced by the inefficiency?—*A.* There is no use of saying that the labour is cheap. In Japan a woman can fill 2,000 boxes a day of ten hours. Our women can only fill boxes up to 500. I saw only one girl who filled 1,200 boxes.

Q. Do you think one of the reasons for it is that girls in Japan are put through a course of schooling for six or eight years?—A. Yes.

Ninety-seven or 98 per cent of the girls in Japan receive elementary education?—A. Yes.

Q. And under one per cent only get it here?—A. Yes. Want of education and training is one of the causes. We had no machinery for filling boxes.

Q. Does education generally increase the efficiency of the labourers because it gives them more interest in their work and invests them with a greater sense of responsibility?—A. Yes.

Q. You say that there should be better facilities for the comfort and education of mill hands in order to improve their efficiency?—A. Yes.

Q. Are you aware of any mill or factory on your side where provision is made for the education of the mill hands?—A. I have not got the experience. There is no mill at Ellichpur which does it. There are no night schools in Berar at all.

Q. Have you any objection to placing the correspondence before the Commission about railway freights of the Alembic Works Company?—A. No.

Q. You say that the railway company have not given any attention to your grievance. In your opinion, the remedy is the transfer of the management of railways from the companies to the State. If that were done you think that Government would give proper attention to the needs of the industry more than companies do at present?—A. Yes.

Q. About small industries in your province, do you think that a superintendent for each district would find enough work to occupy him in promoting small industries in your province?—A. To begin with I do not wish that a superintendent should be appointed for each district. There ought to be one for the Central Provinces and one for Berar, and the staff should be increased as the work increases.

Q. On the whole, the system which you recommend will, in your opinion, promote the small industries in your province?—A. Yes. That is my opinion.

Hon'ble Sir R. N. Moskerjee.—Q. You say, "labourers are human beings and they should be treated as human beings and not as imperfect machines." Have you got any experience?—A. I have not got any experience. I have not examined the mills. I think sufficient attention is not paid to the labourers.

Q. You cannot say from your experience or personal knowledge?—A. I cannot cite any particular instances. That is the ideal which I think should be followed.

President.—Q. Do you mean that you do not get proper housing accommodation?—A. There is no housing accommodation. There is want of schools. I have not seen the mills at Bombay or Nagpur. As far as my knowledge of Berar goes, work is taken and wages are paid and nobody cares to see what the real state of affairs in the houses of the labourers is.

Hon'ble Pandit M. M. Malaviya.—Q. You mean to say that except during the hours that the mill hands work, the managers do not concern themselves with their welfare generally?—A. That is what I think. That is my impression so far as Berar is concerned.

Q. You do not think, so far as you are aware, that there is any care taken for the social life they lead after mill hours?—A. No.

Q. Nor is there provision made for innocent amusements which will enable them to avoid temptation and lead a healthy life?—A. No.

Q. What kind of factories are you referring to in Ellichpur?—A. I am referring to my own match factory. There are three ginning factories at Ellichpur. I have seen operatives there. They are managed by Indians and still they do not take any interest.

Q. Each of them is a small undertaking?—A. Yes.

Q. What number of persons do these factories generally employ?—A. 50 or 60 a day, and 50 or 60 in the night.

Q. Do they work for about 4 or 5 months only in the year?—A. Yes, only in the cotton season. The labourers live either in Ellichpur or in the city.

Q. But do a good portion live near enough the mills to be able to attend a school if it were started?—*A.* I have seen some huts near the mills, that is, for those that have come down from the North-West Provinces.

President.—Q. If they had primary education they would look after themselves?—*A.* They should have primary education. All people are quite ignorant now.

Sir D. J. Tata.—Q. We leased out a land from Government and tried to house our operatives, in Nagpur, but they preferred to live in their own surroundings rather than in the superior surroundings provided for them. They wanted to live with people of their own caste in their own original native place and did not care to avail themselves of the superior accommodation that we tried to find for them?—*A.* If the people are properly educated they will appreciate these things.

WITNESS NO. 141.

*Hon'ble Rao Bahadur R. N. Mudholkar, C.I.E., General Secretary,
Indian Industrial Conference, Amraoti.*

Written Evidence.

I.—Financial aid to industrial enterprises.

Qs. 1, 2 and 5.—I have been taking practical interest according to my capacities and opportunities in the development of trade and industry in India since the last 35 years. The first joint stock company formed in Berar by Indians—the Berar Trading Company—was established at my house when I was living at Akola in 1881 and I was its secretary for the first two years. I also bore a leading part in the establishment of the first factory in Berar in which Brahmins and educated men occupied prominent and responsible positions. I was also one of the founders of the Akola Cotton Ginning and Oil Manufacturing Company which has now developed into the Berar Oil Works, Limited. In this latter concern more than half the paid-up shares are held by my family and more than a third are owned by me. I have been the chairman and chief partner of the Agents' firm of the company and the main task of arranging for the financing of the company and conducting its affairs during the most anxious period of its existence has devolved upon me. I have been chairman since its foundation and also managing director since 1904 of the Amraoti Cotton Manufacturing Company, Limited, which owns a ginning and pressing factory. I own 7-8ths of a ginning factory at Shirala near Amraoti. I am also chairman of the National Financing and Commission Corporation of Bombay. I have put my money in several other industrial concerns, three of which the Agra Stewart Tannery, the Poona Cotton and Silk Manufacturing Company and the Central Provinces Swadeshi Spinning and Weaving Mills are no longer in existence.

I have thus had fair practical experience of the financial difficulties which industrial concerns outside the great commercial cities and industrial centres like Bombay, Calcutta, Cawnpore, Ahmedabad, etc., have to meet, and some knowledge of the causes of the success and failure of industrial enterprise in the mofussil, and have a sufficiently accurate conception of facts to distinguish between the personal element—knowledge and experience—and the element of surroundings, *i. e.*, situation and financial facilities. While not ignoring the great—the supreme—importance of knowledge, skill and experience I wish to draw special attention to the fact that in the mofussil and particularly in these provinces industrial development is greatly hampered by want of sufficient financial facilities. In Berar excepting the two Branches of the Bombay Bank at Amraoti and Akola there is no banking institution to speak of. The Sahukars in our towns and villages concern themselves mostly with lending money to agriculturists and private individuals at pretty high rates of interest. There is a certain amount of capital employed in seasonal factories (ginning and pressing) and in the purchase and sale of cotton and agricultural produce. But there is with a few exceptions practical absence of interest among the capitalists in regard to the development of existing manufacturing industries, the creation of new ones or the resuscitation of those which have gone out of existence. The expression of oil from seeds and the utilisation of the products for preparing articles of commerce, the tanning and leather manufacturing industry, the preparation of glass, the spinning and weaving industry, the utilisation of forest produce and several other things afford a great scope. But these do not attract the money-lending and capitalist class as a class. In another part of my note I am dealing with the special case of the oil seed crushing industry in Berar and elsewhere. The point to note here in regard to manufacturing industries generally is that the desire to stimulate industrial enterprise in Berar is not manifested by the capitalist class properly so called. The impetus towards this movement comes and has come to a very large extent from what, for want of a more convenient expression, is called the educated class, the majority coming from the legal profession.

Actuated by a desire to stimulate the industrial and commercial progress of the country these persons, after a more or less study of the literature on the particular industry they wish to see established, start companies in which some men belonging to the capitalist class and men of moderate means from the middle classes are also induced to join. It happens in some cases—I would say in very many cases—that the original calculations are exceeded either on account of expansion of the original plan of operations or an inadequate appreciation of the real requirements of the concern proposed to be started. And then commences their real period of difficulties. Even where an industrial concern is proved to be based on sound principles, financial assistance is unavailable though sufficient security by way of mortgage is offered. The Presidency Banks cannot and do not lend money on mortgage of immoveable property and machinery. The big joint stock banks in the Presidency towns and elsewhere—European and Indian—follow the methods of the Presidency Banks and refuse to entertain applications for loans on mortgages. Further they say plainly that they do not care to go outside their particular towns. The local capitalists adopt the same attitude; and even the capitalists among the shareholders refuse to come to the rescue. I am, as I have already said above, referring not to hopeless concerns or those based on wrong principles, but those in regard to which such objection cannot justly be taken. The result is that the concern leads a sickly existence or entirely succumbs. The loss in a case of this kind is not only to the shareholders concerned but to the country. An entirely erroneous impression is created in regard to the particular industry which the concern represented and a notion gets about that that industry cannot be conducted with profit in India, or at any rate in that province. Nay a more serious result follows. The disappointment of the particular shareholders has a depressing effect not only on them, but demoralises the whole community, and the cause of industrialism suffers.

This is difficulty No. 1 and a very serious difficulty it is.

Capital is wanted not only for the initial expenditure of putting up a proper and efficient factory, but also for working it fully, and for this also there are hardly any facilities in Berar. In the first place except at Akola and Amraoti no assistance can be expected from the Bank of Bombay; and secondly the regulations under which financial help for working can be obtained from these banks are so rigid and severe that the assistance cannot become available to a company which has substantial security to offer in the way of immoveable property but suffers from a deficiency of cash. As to accommodation from other persons possessing money, the attitude of doubt towards new industrial enterprises, which is characteristic of them, is only accentuated when they are told that the new company wants a loan; and little help is forthcoming from them. Besides as they get interest at high rates on the mortgage of villages, fields and houses they see little inducement in the terms which a business concern can offer.

This is difficulty No. 2.

I shall indicate another obstacle to obtaining capital and that is the restrictions put in the way of obtaining capital or loans from Indian States or Ruling Princes or their near relations. The restrictions in my view are unnecessary and undesirable. In the first place it is not at all easy to obtain a sympathetic hearing from these States. But even when such co-operation is promised, the restrictions imposed by the policy of the Government of India are regarded as serious impediments diminishing the value of the security.

This is difficulty No. 3.

Another difficulty in the way of obtaining capital for new industrial enterprises is that in this country even among men of education and knowledge of the world the expectation is very widely entertained that an industrial concern ought to yield dividends in the very first year of its working. If these dividends are not forthcoming, as they cannot be in very many cases (or rather in the majority of cases), there are whispers and insinuations freely indulged in which seriously affect the position, credit and future prospects of the new enterprise. So widespread and unfair is this impatience that even the most scientifically organised and soundly conducted concern in the country could not escape its shafts. It is by no means rare to see both educated men and capitalists in these outlying provinces naively asking the promoters of an industry as to whether it would not yield dividends from the first year of operations. Where the promoters honestly state that this should not be expected the springs of co-operation become dried.

This is difficulty No. 4.

One more difficulty I shall mention. There are ups and downs in every trade and every industry. People have got accustomed to the vicissitudes of trade and the failures of seasons; and not much is said against the merchant or the agriculturist who is the victim of these vicissitudes or failures. But the same consideration, the same tolerance and charity are not extended to the industrialist whose industry suffers from unforeseen and abnormal circumstances. To him is not extended the helping hand on business terms that is done to the merchant or the agriculturist; nay not even bare sympathy. On the top of all these unfavourable influences have come the bank failures and the dislocation of finances and trade due to the war; and Indian capital always shy has become ten times so since 1913.

These are some of the great difficulties which industrialism has to contend against ; and yet if India is to have her place among the nations of the world, if her masses are to lead a decent existence, her industries have to be developed. Situated as we are Government assistance is absolutely necessary in one or the other of the modes indicated in question 5 for supplying the deficiency of capital for an industrial concern which is useful to the country and which is essentially sound.

In some cases the assistance might take the form of subscribing for shares, in others of guaranteeing a minimum profit for a short period of 5 or 7 years from the commencement of actual working, in yet a third kind of cases loans at reasonable (and in very special cases without) interest on due security might be granted. In some cases Government might themselves start an industrial factory (for example dyes). In other words the principles adopted and the methods followed in regard to railways, canals, agricultural development and improvement should be adopted and followed in the case of industries.

In regard to loans in particular a very liberal policy and a very generous attitude should be adopted with of course the essential condition that proper security is forthcoming. The mere fact that Government after carefully examining the condition of the concern is prepared to advance a loan might in many a case create such a feeling of confidence in the investing public, that persons who would otherwise have refrained from giving any loan might come forward to assist. The simple countenance of Government would in some cases effect salvation.

In addition to supplying or facilitating the supply of capital Government assistance should be given in the other methods (1), (2), (5) and (7) set out in question 5.

There is no reason why method (7) should not be always followed in regard to products which Government wants for its purposes.

This assistance should be confined to concerns which fulfil the following conditions :—

- (a) The head office and directorate is located in India.
- (b) At least two-thirds the capital is held by "Natives of India" as defined by the Government of India Statute of 1870.

In what I have submitted above I have mentioned the case of Berar ; but what I have said in regard to Berar applies also to the Central Provinces districts and in fact to the major part of India.

Q. 3.—There are more ginning and pressing factories in Berar especially in big centres like Amraoti, Akola and Khamgaon than are required for coping with the work. They were, some of them, dumped in simply for obtaining shares when the system of pools existed. With the disappearance of pools many of these have been silent for years.

Q. 4.—I have no experience of such financial aid.

Q. 6.—Government control will have to be exercised when Government subscribes to the share capital or guarantees dividend or gives a loan. In these cases there should be a Government Director, who would watch the working. Control should be exercised in regard to inspection and audit ; but every care should be taken not to throw obstacles in the way of honest working.

Q. 7.—There have been no Government pioneer factories in the Central Provinces and Berar. I have seen, however, the aluminium factory and the chrome tanning factory at Madras. I doubt if but for the pioneering by Government there would have been any aluminium factory till now. The chrome tanning pioneer factory was working satisfactorily under Mr. Chatterton and it is a matter of regret that the Secretary of State should have ordered it to be closed.

Q. 8.—The method of pioneering should be adopted in the case of those industries which are necessary or desirable and are pronounced to be promising by experts, but which require considerable capital, and such capital is not forthcoming owing to absence of experience about their turning out remunerative commercially. Expert direction and guidance as well as capital should be provided by Government and the factory should be conducted as a Government concern under the Department of Industries. The trial should extend ordinarily over a period of five years, and if its commercial feasibility is proved, the factory should be handed over to private capitalists or companies. If at the end of five years it becomes clear that under existing circumstances the industry cannot be successfully carried on, the factory should be closed. But if there is partial success and it appears that with further trials the commercially paying character of the industry can be established, then there should be a further period of three years for carrying on the work or experiment.

Q. 10.—I would strongly urge the establishment of industrial banks in each province, half the capital of which should be subscribed by Government. These banks should be of a different character from the existing banks which are mostly of the usual English •

type. Their main purpose should be the supply of financial aid to promising industrial concerns which are carrying on manufacturing work but are hampered in their operations by deficiency of capital whether on initial outlay or in regard to working; they should also help new enterprises, sound and promising, but hampered for want of capital. The loan should be obtainable not merely on security of "liquid assets" but on that of land, buildings and machinery also. The rate of interest should be reasonable and the repayment should be spread over a reasonable period. The industrial concerns to which financial help should be allowable should be those in which not less than two-thirds of the capital is held by persons having their domicile in India, and the head office of which is located in India.

Qs. 11 and 12—The co-operative societies movement should take in hand the resuscitation and development of cottage industries.

Q. 13.—Where there is a well established industry carried on in several factories by private individuals or joint stock companies, there is, in my opinion, no occasion for money grants in aid, bounties and subsidies, guaranteed dividends, or provision of part of share capital. But if for instance there are in one province some factories manufacturing woollen articles and there is a movement in another province for starting the industry there, it would be proper to give some initial help in the way of loan or supply of machinery and plant on the hire-purchase system or guaranteed purchase by the Local Government for its purposes. But the number of large established industries is so small that all the forms of Government assistance can well be drawn upon without objection.

As to discouragement of fresh private enterprise there is one further thing I would mention. Unless the private enterprise is entirely or mainly Indian (*i. e.*, Statutory Indian) it has no claims upon the Government. There should be no exclusion of aliens, much less of residents of other parts of British Empire; but there ought not to be any restrictions put in the way of granting of facilities for the development of India by the people resident therein, out of deference to doctrinaire principles, or consideration for the residents of other countries. In regard to the mining industry it is high time that some safeguards are enacted to prevent the bulk of mines becoming the property of outsiders. Similar restrictions are necessary in regard to the ownership of land.

Q. 14.—Government assistance ought on no account to be withheld or subjected to limitations on the ground that a new enterprise competes with an established external trade. If such a rule is laid down then there would be absolutely no scope for Government assistance and no possibility of moving it, for no industry can be started or developed in India without competing with an established external trade. Such a limitation would produce the most serious discontent in every part of India and in every community.

II.—Technical aid to industries.

The only occasions on which any of the concerns with which I have connection had any help from Government experts was when we subjected the products of our oil mill—oils and cakes—to the examination of Dr. Harold Mann, Principal of the Agricultural College, Poona, and Agricultural Chemist in the Bombay Presidency, when we sent samples of our linseed and cotton seed cakes to Messrs. Clouston and Plymen of Nagpur and samples of our double boiled linseed oil to officers of the Engineering Department—Executive Engineers and Assistant Engineers.

Our main object was to have the quality of the products tested and to have their position determined with reference to English oils and cakes of these two seeds, and in the case of provincial officers to secure the custom of Government in regard to cakes and boiled linseed oil.

I do not refer here to what I have seen of the work of the Agricultural Department.

It is eminently desirable that there should be highly qualified experts kept by Government to conduct investigations and researches in regard to different industries, to give advice to private persons about the feasibility and paying character of the enterprises they may have in contemplation, to give advice and direction when these are confronted with difficulties, to help them in improving the quality of the products and turning out new ones. As to the publication of the results that would depend upon circumstances and the agreement between Government and factory owners. But some general principles would have to be laid down. Where a process or preparation of an article is carried out successfully by the Government in a laboratory, and the only use that is made of a factory and its own expert is to carry out the working on a larger scale, there is no reason why the results should not be made public. On the other hand if the initiative, the greater amount of the previous working, the entire new experimentations, the testing of the feasibility of the process or the possibility of producing the article were all done at the expense of the factory owner, and the only aid that Government gave was the loan of its experts to advise in some matters, a different line will have to be adopted. A total prohibition of publication is of course out of question when the help of a public officer is

taken. But those who would like to be admitted into the secret might well be put upon terms and required to give reasonable compensation to the person who got experiments and trials made at his cost.

The universities and colleges should be kept in touch with research work. In fact the great aim of scientific education should be to train the mind to handle science in its practical application.

III.—Assistance in marketing products.

I doubt if in the present state of India much benefit will result from establishing more commercial museums. At one time I thought that substantial increase of industrial activity will result from the exhibitions held in the decade between 1901 and 1910, but no advantage commensurate with the money and the energy spent has accrued.

In my opinion it is well worth trying to have sales agencies for the sale as well as display of minor and unorganised cottage industries.

I am very strongly of the view that there should be trade representatives of India in Great Britain, the colonies and foreign countries. These should be Indians who have a knowledge of their country, its state, and its needs and have commercial and industrial experience.

Q. 35.—Yes.

Q. 36.—I see no necessity.

Q. 37.—The principal Government departments which use imported articles should publish lists of these articles and also exhibit them in commercial museums where these exist and in provinces where there are none in a room of the office of the Director of Industries open to the public.

Q. 38.—The rules are not sufficiently liberal. The wording is such that it would be easy for a department to give preference to imported things and discountenance indigenous ones without laying itself open to censure or even criticism.

More than that the rules have not been sympathetically worked. I have heard bitter complaints about this.

Q. 39.—The scope of the industrial banks proposed in dealing with question 10 should be so extended as to include facilities for marketing indigenous products.

V.—Training of labour and supervision.

At least primary education is necessary for every worker, even the so-called unskilled worker. Instruction in the three R's, essential for the every day purposes of life, is indispensable to those who have to apply their facilities to manufacturing work. Where the work involves some exercise of intelligence the training of the intellect is demanded in the interest of the worker and the work. The first basis of all social life is universal education. It has to be free and compulsory. Over and above this there must be drawing for the training of the eye, and for the training of the hand and introduction to his work there should be the particular type of manual training which is suitable to the boy's contemplated avocation. For persons whose circumstances demand that they should earn their bread from their boyhood or early youth, there should be instruction in the industrial school in which practice should be the main feature. The instruction received in the class room and workshop of the industrial school should be developed and rendered still more subservient to actual work by a system of apprenticeship in the factory or shop. This system has yet to be established and followed.

For the more skilled workmen there should be more advanced general education and higher special industrial instruction, with an inculcation of the principles of the particular craft. For supervisors and controllers there should be general middle education or higher education and more advanced instruction in the principles underlying the industry and inculcation in the higher grades of practice.

Q. 54.—It is a fact that there is no uniformity in the standard of the examinations for mechanical engineers held in the various provinces where engineers in charge of prime-movers have to be certified. It is eminently desirable that there should be uniformity.

VI.—General official administration and organisation.

If the suggestions made by me under section I are accepted and Government decide to give financial assistance in the manner indicated in question 5 and provide the necessary funds for giving such assistance, then all that is needed in the way of general official administration and organisation is to have a Director of Industries for each province assisted by an Advisory Board. The Director should, if possible, be a person with considerable commercial and industrial knowledge and experience. But if no such person is available then it will be necessary to be content with one who has a high class general education and has devoted time and energy to the study of industrial and commercial matters.

The members of the Advisory Board should be persons taking actual part in the conduct of industrial or commercial concerns.

VII.—Organisation of technical and scientific departments of Government.

Q. 64.—There should be an Imperial Scientific and Technical department consisting of a number of highly qualified experts capable by their study of principles and practical experience to conduct experiments, investigations, and researches in the different branches of industries, and to give advice and directions calculated to assist in the creation of new industries and the improvement of the existing ones. Mechanical engineering, electrical engineering, textile manufacture, the chemical industries, mining and metallurgy have all to be represented. It should be their duty to examine all schemes submitted to them, and to give advice thereon, to conduct experiments and carry on investigations and research in their various departments of applied science. They should be recruited from among men eminent in the respective branches of applied science to which they have devoted themselves and should combine mastery of principles with fairly long practical experience.

If such an Imperial department is constituted on the lines indicated and properly equipped, there would in general be no need of provincial departments.

Q. 71.—Technological research institutions should be so established as to fit in with a general development scheme for the whole of India. A time may come when each province may have its own fully developed and equipped scheme of institutions for research in every one of the main departments of applied science. But that time is far off.

These institutions should be under Government control and the control should be Imperial. But every one of such institutions should be under the obligation to conduct investigation into schemes sent to them by provincial Governments, make experiments in regard to them and give advice to them or to persons coming through them.

Q. 74.—Co-ordination between the different institutions is necessary.

Q. 77.—By grant of leave, payment of expenses and allowances.

IX.—Other forms of Government action and organisation.

Q. 97.—My province had long to complain of inadequacy of transport facilities in regard to railways and roads; and it has fallen to my lot to draw attention in the Imperial and Provincial Legislative Councils to the disadvantages it is suffering from. Railway lines pronounced to be necessary two decades and more ago, and which were set down as sanctioned projects and were for several years and even now are so mentioned, yet remain to be constructed, while lines the need of which was not obvious to the general public and which after construction have not worked satisfactorily have received preference. Berar wants roads badly for its trade.

Q. 98.—I have in another part of this note dealt with the curious system of railway freight which obtains in this country. The railway tariff seems to be drawn up more for giving encouragement and facilities to the transport of articles of exports to the main ports and the conveyance inland of articles imported abroad. The rates of freight for transport from one inland town to another are as compared to those very high and throw great obstacles in the way of inter-provincial trade.

Q. 99.—We want in Berar the following railway lines :—

- (1) The Hingoli-Basim-Akola-Akot-Khandwa line.
- (2) The taking of the main line of the Bhusawal-Nagpur Section of the G. I. P. Ry. through Amraoti.
- (3) The Amraoti-Chandur-Bazar Ellichpur line.
- (4) The Amraoti-Morsi-Narkher line.
- (5) The Khamgaon-Jalna line.
- (6) The Dhamangaon-Yeotmal line.

Q. 101.—The very serious effects on the trade of the country produced by the tremendous increase since the outbreak of the war in shipping freights (from 20 shillings to 210 and 220 shillings a shipping ton of 17 cwt.) is dealt with so far as one trade is concerned in my answer to question 110.

I see no reason why Government should not step in to regulate this. It seems unjust that one trade should amass wealth at the expense of all others.

Q. 104.—Yes. The industries mentioned in brackets at the end of the question.

Q. 110.—The industries in which I am specially interested at present are the linseed crushing and cotton seed crushing industries. For both these industries Berar possesses great facilities, both these can be developed with advantage to the province and the country generally and both have a very promising future if only sympathetic help is given.

In the manufacture of linseed the main products obtained are (1) the cake and (2) the oil. Various articles of commercial value are evolved by manipulating these.

- (1) The lincake is one of the best foods for live-stock, especially for dairy cattle. As to its intrinsic feeding value it is surpassed only by the decorticated cotton cake carefully manufactured. After grinding cake meal is made from it. Also balanced foods are made from it under established brands mixing the meal with oats, hay, etc., to suit particular species of cattle.
- (2) The lin-oil when fresh is used for edible purposes in the Central Provinces and Berar. Cold pressed oil is the ideal varnish oil. Paints and pigments, boiled oils, refined and special oils, printers' inks, lithographers' oils, linoleum, rubber substitute and special soft soaps are made from this oil by the addition of various chemicals in the treatment of the oil.

The products from cotton seed are:—

- (1) Linters which are used in carpet manufacture.
- (2) Hulls which are used as (a) cattle food by itself, (b) fuel, the resulting ashes being very rich in phosphoric acid and potash is highly prized by tobacco growers as manure, or (c) as material for paper making.
- (3) Meats, from which are obtained (a) cake and meal which is a highly concentrated cattle food as well as a rich fertilizer containing about 7 per cent. of nitrogen and (b) crude oil which on refining yields the ordinary summer yellow oil which can be rendered almost waterwhite by bleaching. By subjecting this oil to a very low temperature and then straining it through press a quality known as "Winter Oil" is obtained. The remaining substance resembling *ghee* is used in America for making butter substitute. The soap stock left on refining the crude oil is mainly used for making soap powder.

Linseed is crushed in the factory of the Berar Oil Works for obtaining raw oil, preparing double boiled linseed oil therefrom and utilising the cake for export to Europe. The raw oil is all taken up for culinary purposes in Eastern and North-Eastern Berar and the Nagpur Division. The boiled linseed oil is mostly sold in the Bombay market where it has obtained some footing and often fetches a higher price than any other India-made double boiled linseed oil. It has been examined and tried by Government Engineering Officers and large contractors and pronounced equal to superior European articles of the kind. The cake has been subjected to tests on different occasions and found equal to the European products, both as cattle food and manure. The main obstacle to the disposal of the cake has since 1914 been the difficulty—at times impossibility—of obtaining shipping and the tremendous rise in freights. In the early part of August 1914 a consignment of my company which had been shipped had to be taken out because the steamer was requisitioned by Government on the outbreak of the war and for months no cake could be shipped. The same thing has happened again twice. Prior to the war the rate of freight was 20 to 22 shillings per shipping ton. Since then rates have not gone down below 50 shillings, for a considerable part of the last year stood at 150 and 160 and now stand at 210 and 220 shillings. The price of lincake in the Liverpool, Hull and London markets has, it is true, gone up greatly. But even then the rise in freights is not fully covered and there is still a great difficulty of securing freights. Now linseed cake is a superior cattle food and is used for horses and for stock cattle in Europe. Government departments purchase this cake. By making purchases in England the Government have to bear the charges of the up-country, the Bombay and the English middlemen—the agents, the brokers and sellers. If they buy direct from the producers Government would be saved the avoidable charges of middlemen, while giving a fair price to the producers. Further the shipping charges to Government by the requisitioned steamers would be much less than what they have to bear from making their purchases in England. To the producers the custom of Government would afford a sure market for at least a fair part of their cake. In every respect both Government and the producers would be gainers by the establishment of direct relations.

This would be in regard to purchases for use in the United Kingdom and other parts of Europe. If Government use lincake instead of gram for their Artillery and Cavalry horses in India, they would be obtaining a superior cattle food at a lower price. Gram now sells at the rate of 9 seers per rupee (at to-day's wholesale rates), whereas we can at our mill premises give 11½ to 12 of lincake, a gain of more than 25 to 33 per cent. Further the gram purchased has impurities which have to be eliminated, whereas the lincake is a pure food from which earth, sand, pebbles and other impurities have been removed.

To the debit side of these gains might be put the railway charges. But if the vagaries and inequalities of the Indian Railway tariff are removed and cake as cattle food is carried at the same rate as cake as manure, and the waggon rate concession that is given to consignments to Calcutta or Bombay is extended to inter-provincial consignments, the

railway freight charges will cease to be the heavy drags on indigenous industry that they are. How unfairly the present system works will appear from the following facts:—

The railway freight on oil cake from Amraoti to Bombay, a distance of 418 miles, is Rs. 9 per ton and from Akola to Bombay, a distance of 363 miles, is Rs. 8. For the same cake sent from Akola to Amraoti, a distance of 56 miles, the charge is Rs. 5 per ton and from Akola to Nagpur, a distance of about 157 miles, is Rs. 9 per ton. The charge for 157 miles is more than for 363 miles. The rate itself on consignments within the country is extraordinarily high. The rate per maund from Akola to Nagpur is 5 annas 1 pie, that is roughly speaking the railway charges amount to nearly one-third the price of the articles itself. What is therefore necessary is (a) that the rate per maund should not be so disproportionately high as compared to the price of the article, (b) that concession rates for waggon consignments may be given, (c) and that the inter-provincial consignments should not be subjected to heavier charges than those to ports.

In regard to the boiled linseed oil if the Government purchases the superior indigenous article direct from the producers in place of the imported article it will make a gain of from 4 to 5 rupees per drum of 45 lbs. Hundreds of thousands of drums are required every year on railways and in the dockyards by the Government and by companies. A systematic and proper carrying out of the existing Stores purchase rules even would be a great help to the indigenous industry.

The third respect in which Government help is wanted is in the matter of financing. As urged above loans at reasonable interest should be advanced on the security of lands, buildings and machinery to sound concerns to meet part of the initial outlay or working capital.

For the further development of the industry, for the production of other articles—especially paints and varnishes—Government aid should be given first by the research and scientific advice department conducting experiments and trial, and by rendering such assistance as is referred to in question 5 as may be settled by agreement between the Government and the different concerns. The period of the preliminary experiments is one of expenditure with hardly any return. The further trial after the demonstration of feasibility equally involves losses. And even after the commencement of operations on a commercial scale years must elapse before the market is caught and the price yields a fair profit. To throw the whole burden, the whole responsibility combined with anxiety, on private individuals is unfair and not conducive to the progress of the country and is the cause of the retardation of industrial development. The whole country—that is the Government—is under the obligation to bear at least a fair share of the burden and the loss and to give active assistance in every way.

Cotton Seed Oil Industry.

The potentialities of the cotton-seed oil industry are very great in this province. The statement given above showing the products obtainable by crushing cotton seed show how many articles of necessity and convenience can under suitable working be procured. By the ordinary refining process used in the factory of the Berar Oil Works, Ltd., an oil is obtained which for ordinary culinary purposes of middle class and even high class Indian families takes the place of good "Til" or "Kardi" oil and is moreover cheaper than Til or Kardi oil. With further refinement the oil obtained serves the purpose of frying as well as ghee. Certain experiments made show that with still further refining the product can by being mixed in the proportion of 1 to 2 with good ghee, supply a fair substitute for ghee to be served during meals. Prices of butter and ghee have in recent years risen immensely. Two pounds for a rupee is now regarded as a fair rate for butter. Often only 1½ lbs. of butter can be obtained for a rupee. That is only a pound and a half of good ghee can be obtained for a rupee in fair seasons and at times one pound only. This has put ghee almost out of the reach of not only the poorer classes but of the lower middle classes also. The place of ghee in the Hindu dietary is well known. One of the main reasons why the Berar Oil Works went in for the cotton seed oil industry was to produce an article which would alleviate the lot of these classes, who form the bulk of the population. Another advantage to the people from this industry is it can give a cattle food which for draught-cattle is better, purer, more strengthening and cheaper than cotton seed, which is so universally used as cattle food in these provinces. The value as cattle food of the undecorticated and decorticated cotton cake is set out at page 220 of Lamborne, page 295 of Ennis and page 408 of Encyclopædia Britannica Vol. I, 11th edition. As cattle food decorticated cotton cake is shown to be first and undecorticated cotton seed cake is mentioned as next to it. Undecorticated cotton seed cake can be sold 25 to 30 per cent cheaper than the cotton seed itself. In cotton seed as ordinarily given there are several impurities and indigestible and possibly deleterious substances, which have all been eliminated from the cake. It is thus advantageous to all owners of cattle from both points of view to use cotton seed cake decorticated with a due mixture of hulls or the undecorticated one as food for their cattle.

The production of stearine, the manufacture of soap and candle are connected by industries. Preparation of cotton-seed butter like oleo-margarine but with a vegetable fat basis deserves to be attempted and carried out. There is scope also for the meal of the decorticated cotton-seed being turned into flour.

Placing aside the developments which have to be tried in this country, what has been carried out is still at a stage when Government assistance is needed. In the factory of the Berar Oil Works the products obtained by the processes employed are—(a) refined oil, (b) decorticated cake, (c) undecorticated cake, (d) lint, (e) soapstock, (f) hulls. The refining processes used not only render the quality of the oil equal to that of good Til and Kardi oil but make it capable of being used for frying Puris and even Jilebis. It has been tested by Dr. Harold Mann and pronounced to be fit for being advantageously used for culinary purposes. Several Halwais have been using it for frying Puris and Jilebis which are ordinarily fried in ghee. But owing to conservatism the local consumption has not increased as satisfactorily as it should have been among the bulk of the people; and Bombay and Gujrat have mainly to be looked to as the fields for sale. Owing to the distance which has to be traversed, the high railway rates and the large proportion of leakage the Bombay and Gujrat markets are not very profitable—and at times not at all profitable. To combat conservatism the article must be offered at cheaper rates than other oil: and this means loss. So this obstacle has to be got over.

In regard to cake also there is a difficulty. Though admitted by highly qualified persons to be an excellent cattle food and better and more free from faults than cotton seed the local demand still continues to be very weak. Before the war the bulk of our cotton seed cake was exported to Europe. Since the war it was found possible to send only one consignment to England without loss. As the rates of freight have been so unprecedentedly high and the price of cotton seed cake is always lower than that of linseed, it did not pay to export it. Both for this reason and more than that for carrying out one of the chief objects of the undertaking it is most desirable to develop the home market. This cannot be done unless there is the patronage of Government and the active co-operation of the Government departments and quasi-Government agencies like municipalities and District Boards. There should be (i) the guaranteed purchase by Government of the cotton seed cake produced at rates which are fair, just and equitable to all, (2) the use by the Government of the cake in its agricultural and stock breeding farms, Government dairies, for the animals in the military and other Government departments, and of the municipalities and other quasi-official bodies, (3) employment of the agency of the village officials, and agricultural associations in taking the product to the people, explaining the advantage of the same and the publication of results. Along with this the Government should through the Railway Board lay down the same special rates for oil cake when used as cattle food as are laid down for cake when taken for manuring purposes and to extend the concession of favourable rates on waggon consignments to inter-provincial trade.

My friend Rao Bahadur D. V. Bhagwat has shown me his note and though, in regard to some facts our experiences do not tally and some of his figures have to be modified, we are entirely at one on the necessity of Government help if this industry has to be developed. As stated above, the refined cotton seed oil prepared in the Berar Oil Works has been tested and pronounced good by Dr. Mann; has been used and found satisfactory by consumers and has been sold by hundreds of tons in Bombay, Nagpur, Akola and elsewhere. But owing to the facts mentioned above the rates obtained are not as remunerative as they should be. The second thing I would wish to correct is that owing to adventitious causes and unfortunate accidents there were losses on some of the consignments of our cotton seed cakes and these have affected the average price: in many of the consignments and especially latterly we have realised after payment of all transit, agency and other charges from 40 to 45 rupees per ton on undecorticated cake when cotton seed stood at Rs. 10 to Rs. 10-8-0 per khandi of 440 lbs. Then as to the expenses to be charged per ton there is a difference of from 3 to 5 rupees per ton between us. We are in agreement as to the mode of calculation. But his deduction of the figure 30 is not correct. I place the figure at Rs. 25 per ton. Making the corrections consequential on these considerations and on the other hand leaving a margin for fluctuations and accidents, I would say that the realisations from sale of cotton seed oil and cake *under the present circumstances* (with the load of experimenting and pioneering burden upon us) would just meet the cost of production and other charges or leave a small margin of profit from 2 to 3 rupees per ton—a very poor recompense for the heavy sacrifices made. I therefore support his suggestion that Government should for some reasonable period—not less than 5, not more than 10 years—take over the undecorticated or decorticated cotton seed cake and hulls at a reasonable price calculated on the basis mentioned above.

I, however, submit the further request and that is that in view of the fact that the work done by the Berar Oil Works being pioneer enterprise, and the expenses incurred and burdens borne by it in regard to this being heavy, the Government should advance to it a loan of 3 lakhs at 6 per cent per annum secured on its lands, buildings and machinery and plant.

Oral Evidence, 16th December 1916.

Mr. C. E. Low.—Q. Can you tell me to what extent the gins, presses and factories in Berar are capitalised by local capital?—A. I cannot give you the exact proportion, but excepting the old companies, Messrs. Ralli, Volkarts, the New Mofussil Company and Harvey and Sabapathy & Co., most of them are local people.

Q. And those companies which you mentioned, run about 40 or 50 gins and 9 or 10 presses or something like that?—*A.* I do not think they represent more than 20 per cent of the total gins and presses in Berar.

Q. And they are concerns which take their origin from the time when the exploitation of cotton on a modern style was first started in Berar?—*A.* Yes. The New Mofussil Company is practically an Indian concern, and its head office is in Bombay. Similarly Harvey and Sabapathy & Co. is also an Indian concern. West Patent Press Co. is an English concern, I understand.

Q. They are not very extensive?—*A.* The only press of theirs in Berar is at Amraoti. They have only got a pressing factory. There are in Amraoti two Calcutta firms, one has only a pressing factory and the other has got a ginning and pressing factory. These are Indian firms of Marwari gentlemen. As I have said the majority of the new accretions are mostly from Berar.

Q. With the exception of Rallis, Volkarts and the Wests, the whole of the capital in gins, presses and factories is Indian?—*A.* Yes.

Q. The cotton crop in an ordinary year from my experience is valued between 7 and 11 crores of rupees from Berar?—*A.* Yes.

Q. How much is that financed by the Bank of Bombay, about one-third?—*A.* I do not think as much. Less than one-third.

Q. How is the rest financed?—*A.* By local capitalists, or the purchasers borrow in Bombay or elsewhere.

Q. Does most of the money come locally or from Bombay?—*A.* I should think the bulk of the money comes locally.

Q. Then there is a great deal of local capital—very large sums invested either permanently in industries, or temporarily in the seasonal financing of the cotton trade?—*A.* Yes.

Q. And yet you say that there is difficulty about getting local capital to engage in an industry like oil mills?—*A.* Yes.

Q. Do you consider that Berar people are less enterprising than the average Indian people?—*A.* I do not think that the Berar people are less enterprising. I have been careful to point out that they are not yet convinced of the immediate success of manufacturing industries. I make a distinction. I do not consider ginning and pressing as manufacturing industries. They only prepare raw materials for manufacture.

Q. You speak of the difficulty experienced in obtaining finance from banks. Did you approach any European or Indian joint stock bank?—*A.* I approached in some cases the banks themselves and in some other cases the leading members of the banks. The proposition which was put before them was whether they would make advances on the security of the lands, buildings and machinery to make up the deficiency in capital and in regard to that the answer from every one was that it was not at all possible. That was in regard to the initial outlay. Then in regard to working, they required from 20 to 25 per cent as margin, and in regard to two or three factories about which I had to sound them they insisted upon cash or Government paper or liquid assets coming up to 20 or 25 per cent being given to them.

Q. You found the same in the case of both the Indian and European banks?—*A.* Yes.

Q. What do you consider to be the reason of this?—*A.* The reason is that they do not wish to lock up their capital in advances which would take some years to return. That was the main reason which they advanced. They say they advance to persons who would give them immediately marketable commodities as securities.

Q. They draw a very large portion of their working capital from deposits of money which they have to pay back?—*A.* Yes.

Q. The reason then would lie in the nature of their own resources?—*A.* Yes. They say that their business has been started mainly for the purpose of giving loans for short periods and not for long periods.

Q. I want to ask you one or two questions regarding assistance by Government to industries. Supposing Government gave a loan to the industry, they would, of course, retain a prior charge on the industry by way of mortgage?—*A.* Yes.

Q. Would that not frighten the money-lender if the concern wanted to borrow from anybody else? You say that the grant of a loan by Government would help the concern and encourage other people to help it, but don't you think that the existence of a prior Government charge would rather frighten the ordinary money-lender?—*A.* No.

Q. My experience is that such is the case where land improvement loans have been given and if there is Government's prior charge on account of the improvement loan the ordinary

local man is frightened?—*A.* Because in that case the agriculturist requires the money for his own private purposes, and the lenders say that there is hardly any security. Here in this case if there is Government assistance given, let us say for the sake of meeting a deficiency in regard to the initial outlay, the people would say, here is a concern the success of which is felt as highly probable by Government, and so there will be no harm in lending it money on the security of equivalent liquid assets without insisting upon a margin.

Q. You think that if Government investigated through a really competent agency and thought the concern good enough to advance money to it, that would give the people confidence?—*A.* Yes.

Q. One suggestion made by you and by your friend Mr. Bhagwat was that Government should undertake to purchase for a certain length of time the whole or some portion of the output of the oil mills?—*A.* Yes. My suggestion and his was in regard to cotton seed cake.

Q. Let us take this particular case of cotton seed cake. How much cake would Government have to take to help?—*A.* Suppose I work my factory for 24 hours, the output of cotton cake would be about 80 per cent roughly speaking, and so it would be about 20 tons a day. For a month it would be 500 tons. Cotton seed cake is considered to be the best food for cattle. That is what eminent authorities say. Decorticated cotton seed cake is mentioned both by Ennis and Lamborne as the best food and next to it is placed undecorticated cotton seed cake and below that is placed linseed cake. We have thus the best food, the food value of which is much higher than that of cotton seed itself. All our cattle in Berar and the Central Provinces are fed on cotton seed. Instead of that if they would only take cotton seed cake, it would be given to them 25 to 33 per cent cheaper than cotton seed. That is one advantage to the persons owning cattle. Then apart from the experience of men like Dr. Harold Mann and other gentlemen belonging to these provinces whom I have consulted, there is the experience of men who have actually fed their cattle on cotton seed cake, and that is that cotton seed cake is more nutritious than cotton seed itself. What we say is this. The point requires to be more fully developed. The Government agency that is, the agency of the village officials and others, should be enlisted for the purpose of popularising for a time this cake. The more adventurous, more enterprising among the owners of cattle and owners of land have tried it and they are taking to it, but the progress is very slow and mills cannot afford to work and wait for years and years in the mere expectation of finding an ultimate market. It was in this respect that my friend Mr. Bhagwat and myself suggested that Government should take it and see that it was sold and taken up by the villagers. For that purpose the village agency and taluka agency should be employed.

Q. The Government could not undertake it unless they have the machinery. They could not buy it and then hold it unless they could see a way to sell it, and they have to make arrangements beforehand?—*A.* In that way, there is already the village agency which is a highly developed agency in Berar.

Q. Your idea is that the responsibility for selling some portion of the output of your cake should be thrown on Government which should definitely assume responsibility for selling that cake?—*A.* Only for a short time.

Q. It does not matter whether it is long or short. They will have to make arrangements—I do not say that it is necessarily impossible, but it takes sometime to see their way to do such a thing. I suppose you consider the advantage you would gain that if Government definitely assumed responsibility for doing so their help would be more certain and the Government would exert themselves more in the matter?—*A.* The example of Government would have a most highly favourable effect. Then the people would learn that Government are satisfied about the advantages of this cake and that they are prepared to push on its sale, and then many more people would be coming voluntarily for it without any effort on the part of the Government.

Q. At the present time the Agricultural Department is trying to popularise the sale of cake by demonstration?—*A.* Yes, to some extent.

Q. What has been the practical result of that demonstration?—*A.* They have been taking it only on their farm at Akola. I have explained in another part of my note how difficult it is, on account of the very high tariffs imposed by the railways, to send the cake to distant places.

Q. My point is this. What is the Agricultural Department doing in other parts of Berar to popularise the sale of this cake?—*A.* Nothing beyond taking it on their farm.

Q. They are not demonstrating it as they do their other processes?—*A.* No.

Q. Have the agricultural associations been asked to help?—*A.* No.

Q. The delivery would be by cart?—*A.* Yes.

Q. Most of your deliveries in Berar would be by cart?—*A.* Yes.

Q. Putting aside the question of Government taking the responsibility for the money what do you think that the Agricultural Department should do over and above what they are doing to popularise the sale of cotton seed cake?—A. First of all, they should help in the dissemination of information in regard to the value of the cake and its cheapness.

Q. That, of course, is rather a general sort of idea. Do you think that they might distribute small quantities at fairs and exhibitions?—A. Yes. The next thing which they might do is this, to utilise their agency to distribute this kind of cake among the people. In the beginning the mills would be prepared to send samples at their own expense without charging anything for it. First of all, popularising it by exhortations to the people and secondly by distributing the product to the different villages.

Q. Supposing the Government took the responsibility for selling this cake for, say, two years and they found that they could not sell it except at a very cheap rate which did not pay you, then, after the two years was over, you would find that the market for cake would be no better?—A. By the end of the two years the people would have a fairly good experience of the value of the cake and of its cheapness as compared to the cotton seed. Supposing Government was selling 35 or 40 per cent cheaper than cotton seed itself and at the end of that period if we offered to sell for 30 per cent cheaper, that would be sufficient temptation for people to buy it.

Q. My point is this, that where Government themselves were large consumers for military purposes as well as for Government farms, it would, of course, be pretty easy for them to take over a certain amount of cake. But if you simply wish to throw on them the responsibility of selling, I do not know whether Government will be an efficient agency, and their action might land you in difficulties?—A. Purchase by Government for their departments, the Military Department and the Agricultural Department would go a certain way to take off our cotton seed cake, but still I beg to say that it would not be at all difficult for Government to carry on the distribution with the aid of the village agency which is very highly developed in Berar.

Q. It is a definite and practical proposal which you and Mr. Bhagwat have made and I should like to examine it in some detail and perhaps you will put in a note showing, so far as you know, how much the Government departments could actually take without coming into competition with other factories making cotton seed cake?—A. I do not at all wish that there should be any discrimination between the different factories. They should be treated equally.

Q. Have you supplied any cake to the Government Military Departments in Kirkee or elsewhere?—A. Only one consignment was taken, but after that there was no second order. The order was for a dairy.

Q. And not for Supply and Transport Corps?—A. No.

Q. You talk of Military Departments buying cake from England?—A. Yes.

Q. Do the Military authorities out here buy their feeding cakes from England?—A. The Military authorities in England buy cake in England,—I mention that with reference to linseed which I was told by our importers was being used to a large extent in feeding the horses of the Military Department.

Q. You say that pools, and combines have stopped. They have not stopped everywhere?—A. Not everywhere. There was not any pool to speak of in Nagpur. There were pools in Amraoti, Akola, Khamgaon and Shegaon. In Akola they ceased eight or nine years ago, in Amraoti three years ago so far as pressing was concerned, and in regard to ginning about six or seven years ago.

Q. Why did they stop?—A. The difficulty in regard to the pressing was they said that if a certain leading firm was also willing to join in the combination then alone they would go in for it, that is,—Messrs. Ralli. They were in the combine for a long time in Amraoti and Akola, but afterwards they considered that joining the combine would not be helpful and would not be a matter of advantage to them.

Q. I understand that joining your combine meant dearer cotton?—A. Yes.

Q. And it was not to their interest to join in a movement which meant dearer cotton?—A. No. Even when they orally said that they would give an undertaking that they would not press cotton for other people or buyers, some of the other people considered that that was not sufficient and one of the firms, after the whole thing was settled and a preliminary agreement was drawn up, said, that unless there was an agreement in due legal form executed by Ralli's they would not go in for the pool arrangement and that was what broke the combination in Amraoti.

Q. A combination means that there are more gins. The people do not get enough cotton for ginning?—A. The ginning factories except one or two are all working. There are two factories which are not very efficiently worked and they are silent in Amraoti. The others are working night and day during the season.

Q. So far, the stopping of combinations is a good thing?—*A.* Yes, from the point of view of the buyer. But in that case the competition among factory owners is so great that beyond working expenses many of them do not make any profit whatever, nay not even margin for meeting the depreciation charges.

Q. The result of that in the past was that it led to the formation of fresh combinations?—*A.* Yes, but I do not know if there is any likelihood of a combination again coming into existence.

Q. So long as Messrs. Ralli stand out?—*A.* Yes. What has happened in this year particularly is that the persons who went on competing at very low rates saw the unwisdom of their course and most of them now have joined in asking rates which leave some margin of profit, though not enough margin.

Q. When having a definite combination, two or three gins work day and night and the other gins stand aside and draw their share of the profit?—*A.* Permit me to make one slight correction in what you say. So far as the ginning factories went, excepting two or at the most three factories in Amraoti, the others had to work even when there was a combine almost night and day, certainly for 12, and often 15 or 16 hours a day. The result of the cessation of the combine has been this that competition was carried on at almost non-paying rates. Now that process is being corrected and people are now asking rates which will leave some fair margin of profit.

Q. I think I have heard of cases which have come to my notice either officially or otherwise of combines—whether in the Central Provinces or Berar I do not recollect—in which the gins did positively stand idle as the result of the combine and draw profits?—*A.* There have been such cases. In Akola and Amraoti there are very few gins which have not any work.

Q. You suggest that the forms of what may be called artificial assistance should be confined to companies which are registered in India and two-thirds of whose capital are owned by statutory Indians?—*A.* Yes. I only meant to say this thing, that this assistance is to be given for certain definite reasons, namely, to draw Indians more and more to industries.

Q. It is to give help to the class of people who are left behind and want such assistance, whereas other people are quite capable of looking after themselves?—*A.* That is my point.

Q. My difficulty is not in regard to the principle, but in regard to the means of making it effective? There may be devices by which description of this sort may be complied with in the letter but not in the spirit?—*A.* This is a thing which is not determined upon the composition of the company at the start. Every year when the question of continuing the assistance has to be considered the Government would have to be satisfied that two-thirds of the capital (or some such portion) is owned by Indians.

Q. You make a suggestion regarding the restriction of transfer of ownership in certain circumstances to non-Indians. Would you do that in the case of nations which do not impose any corresponding restrictions against Indians in their own countries?—*A.* I did not consider the thing when I wrote it in that aspect. My main object was this, that in view of the fact that, for instance, certain foreigners who at one time were friendly are now enemies and they obtain concessions in regard to lands and mines and others which have created very great difficulties: it is eminently desirable that there should be restrictions about granting rights over land to foreigners who do not belong to the Empire.

Q. You only mean the people outside the Empire?—*A.* Yes. And in regard to the Empire there would be the principle of reciprocity. If there is a part of the Empire which makes a discrimination against India, then I believe in sheer self-interest it would not be improper for us to say that we should also be permitted to make a discrimination against them.

Q. That is to say, you would treat them as they do you?—*A.* Yes.

Q. You say that the Stores Rules are not sufficiently liberal. Would you explain in what respects?—*A.* It was, I believe, in 1906 that the Government of India appointed a committee to investigate this question of the purchase of stores. That committee made recommendations, and if I remember correctly, the recommendation was that preference should be given to country-made articles wherever these could be had at reasonable rates. I do not profess to reproduce the exact wording of the recommendation, but I believe it was very much to this effect. The rules made in 1909 laid down rather stringent conditions and then came the rule of 1913. When I say that the rules must be more liberal I mean that Indian goods should be purchased even if they involve a small sacrifice on the part of the Government.

Q. Costing more money?—*A.* Yes. I would not put the limit beyond 5 or 7 per cent.

President.—It would be a bounty?

Mr. C. E. Low.—*Q.* You want Government assistance in the manufacture of cotton seed oil as well?—*A.* On the question of the manufacture of cotton seed oil, what I meant to say was that by the ordinary refining process which we adopt we produce an article which is as

good as til oil. That does not involve very high cost, and there is a good market for it and provided there is an enough market for the cake, the company will be more than self-supporting and a certain amount of profit will be left behind. When we want to carry on double refining process or treble refining process, first of all, certain trials have to be made and more expenditure has to be incurred and it is in regard to this that I suggested that there should be Government assistance in the way, first of all, of expert advice, and secondly in the way of purchase of article produced.

Q. If you want to use it as a substitute for ghee is double refining necessary?—

A. It was only tried once, and a gentleman whom you know took the oil and mixed it in the proportion of one-third to two-thirds, and served out to hundreds of people and they could not make any difference between the ordinary ghee and that ghee.

Q. In that process there is a good deal of waste?—*A.* Yes, and there is also additional cost.

Q. In the process of ordinary refining, there is not so much waste and do you think it is good enough in your experience as a crude oil among the poorer classes?—*A.* Yes.

Hon'ble Pandit M. M. Malaviya.—*Q.* You say there is another obstacle in raising capital, namely, restrictions put in the way of obtaining capital or loans from Indian States or Ruling Princes or their near relations. Do you know what the rules are exactly?—*A.* There are no rules. There are departmental orders or directions of the Government of India. I have got personal experience of this.

Q. Do they require that any transaction which is entered into by a Ruling Prince or his near relation shall be approved of beforehand by the Government of India?—*A.* According to the directions of the Political Department, it must be obtained beforehand, and if it is not obtained beforehand, I know of instances where relations of Ruling Princes were required to divest themselves of the immoveable property which they had purchased in British India as early as possible and pressure was brought to bear on them.

Q. Does a similar provision exist in regard to loans which are not secured on immoveable property?—*A.* In regard to that there is only the general clause in the Civil Procedure Code.

Q. Is the law which prevails on this point in force in Berar different?—*A.* The same principle is followed.

Q. Have you the Transfer of Property Act in force in Berar?—*A.* It has been extended from 1907.

Hon'ble Sir R. N. Mookerjee.—*Q.* There is no restriction on their buying shares in any company?—*A.* They may take shares, but if they want to take debentures on immoveable property, the same question arises, because that is interest in immoveable property.

Hon'ble Pandit M. M. Malaviya.—*Q.* In the case of Tata's works has not most of the capital been invested by the Native States?—*A.* I am speaking of a transaction carried out openly in the name of the State and for the benefit of the State, and I know of more than one instance where it has been said that Indian Princes and relations of Indian Princes should as far as possible be discouraged from obtaining interest in immoveable property in British India.

Q. Does a similar restriction apply to foreigners like the Americans, the Japanese or the French?—*A.* No.

Q. Then an American company or a Japanese company can lend you money and can sue you?—*A.* Yes. The restriction applies only to the case of Ruling Princes of India.

Q. You think that this restriction should be entirely removed?—*A.* Yes.

Q. Do you expect that our Ruling Princes would then be willing to invest in industrial enterprises in British India?—*A.* I mean to say that they might be induced more easily.

Q. You say that in your opinion in order to develop Indian enterprise it is absolutely necessary that Government assistance should be given in one or more of the forms which you have indicated?—*A.* Yes.

Q. You are not particular about what the exact form of assistance should be? That might be determined, but you think that some assistance should be given?—*A.* Yes.

Q. You have suggested that industrial banks should be started and in answer to Mr. Low you stated that an industrial bank with Government assistance if necessary would serve the purpose of providing financial assistance to business enterprise?—*A.* Yes.

Q. You say in your note that half the capital of such a bank should be subscribed by Government?—*A.* Yes.

Q. Suppose, instead of doing that, the Government guaranteed five per cent interest or such interest as they thought reasonable, would not the object be attained?—*A.* I suggested Government's taking a direct share.

Q. I am not opposed to it. I am only putting forward a second suggestion. I am not disputing the correctness of the other. I want to know, if the Government instead of

subscribing a part of the capital, guaranteed five per cent interest, for, say ten years, do you think that would give sufficient stimulus and encouragement to the public?—*A.* In that case in the constitution of the bank it will be necessary to impose a condition similar to what I have suggested in regard to Government help to Indian concerns, which are the concerns to which the help is to be given.

Q. Assume that these conditions are laid down. Then you think that if Government guarantee interest on those lines, it will secure what you wish to provide for by the Government being requested to subscribe a share of the capital?—*A.* Yes.

Q. You think that these banks should lend money on the security of land, buildings, and machinery and plant?—*A.* Yes.

Q. Do you know of the constitution of the Industrial Bank of Japan? It is very much on the same lines?—*A.* If my recollection is clear, I believe it is.

Q. It makes its loans on the security of lands, buildings, belonging to factories?—*A.* I also believe that if there is a project, the project is examined and without the factory coming into existence, on the security of the factory itself, loans are advanced.

Q. Confining ourselves to the first portion of your recommendation that it should advance money on the security of land, and buildings belonging to the factory, and of course, on goods belonging to the factory, what do you think should be the debenture of such a bank, in order to attract capital from the public? In Japan they have 50 yen, that is, Rs. 75 or more. Do you think debentures of the face value of Rs. 50 would attract a good deal of capital?—*A.* Shares of Rs. 50 or Rs. 100. They should not exceed Rs. 100.

Q. Do you think that a subsidy for payment of interest at 5 per cent for ten years will be sufficient to encourage the public to invest in it?—*A.* Yes.

Q. You have suggested that preference should be shown to indigenous products and that their cost should not exceed the cost of the imported articles by more than 5 or 7 per cent?—*A.* Yes.

Q. Have you any particular reason to support this suggestion that it should be 5 or 7 per cent?—*A.* At one time I know a condition was laid down in regard to certain articles that, first of all, the article should be shown to be as good as the one which is imported, and secondly that the indigenous article should be sold five per cent cheaper than the imported article. We raised the question in the Council in 1911 about it and then this five per cent disappeared.

Q. Till then, the rule was that not only should the indigenous article be good or nearly as good, as the imported article, but that it should be five per cent lower in price?—*A.* Yes.

Q. Do I understand you to mean that in as much as a difference in price of five per cent was fixed in favour of imported articles, till 1911, you should have a five per cent preference in favour of indigenous articles for, say, ten years?—*A.* Yes. That will quite suffice.

Q. In answer to question 13, you say, "Where there is a well established industry carried on in several factories by private individuals or joint stock companies, there is, in my opinion, no occasion for money grants-in-aid by Government, ... But if, for instance, there are in one province, some factories manufacturing woollen articles and there is a movement in another province for starting the industry there, it would be proper to give some initial help in the way of loans or supply of machinery and plant"?—*A.* Yes.

Q. Do you know how many woollen mills there are at present in India?—*A.* Five. The value of the woollen imports was over 70 lakhs.

Q. And you think that this industry may well be supported by Government in spite of the fact that there are a few well established woollen mills in the country?—*A.* And also in view of the fact that a very large quantity of wool is exported.

Q. You are strongly in favour of elementary education being made free and compulsory?—*A.* Yes.

Q. Do you think that drawing and other kinds of manual training should form an essential part of the elementary school course?—*A.* Yes.

Q. Would you also introduce a little elementary science in the upper primary classes?—*A.* Yes.

Q. Do you think that that will make our workmen more efficient and more likely to be able to deal with machinery of various kinds that may be used in future in this country?—*A.* Yes.

Q. You suggest that there should be an Advisory Board to assist the Director of Industries?—*A.* Yes.

Q. Would you make it merely advisory or would you make its advice binding upon the Director of Industries?—If it is merely an Advisory Board, the Director being free either to

accept its recommendations or not to accept it, an apprehension is entertained in some quarters that capable men may not be drawn towards the Board?—*A.* I can only go by the experience I have, and I have no cause to complain of the non-receptivity of our Director of Industries.

Q. I have put the case without any reference to any individual directors. We have in more than one place very good directors at present, but I am speaking of the system. Would men of business ability be willing to give their time and attention to advising in the matter of industries, if they found that they were only recommendations which the Director might accept or not?—*A.* In spite of this danger, for the present I would just try the present system because as I have proposed, there is to be an Imperial institute of experimental investigation and research.

There is nothing certain about it yet. That is a matter which is being considered.

President.—Q. You would like to consider the other side of this proposition? If the advice given by the Board were binding on the Director, would you ever be able to get a good business man to be Director?—*A.* That is also another aspect which has to be considered. If really good suggestions are made by business men the likelihood is that the Director would agree to them. If the Director does not agree to them, there is nothing to prevent the Advisory Board putting their views before the Local Government. For the present, I would be content with having an Advisory Board and not tie the hands of the Director, nor at the same time, so to say, increase the responsibility of the members of the Board, because if the views of the members of the Board are to be given effect to, we ought to have some guarantee that the recommendations which they make are really practicable and can be carried out with due economy.

Hon'ble Pandit M. M. Malaviya.—Q. You say that the Department of Industries is necessary if it is to give assistance to industries?—*A.* Yes.

Q. With whom would the decision to give or refuse financial assistance to any enterprise rest? Entirely with the Director of Industries or with the Director of Industries and the Board which advised him?—*A.* The Director of Industries, and he has to take the advice of the Advisory Board.

Q. Supposing he does not agree in a particular instance with the advice of the Board, would you make it a condition that he should report the matter for the orders of the Government before taking action?—*A.* In this matter, I believe it is the Local Government which has ultimately to decide. Even the Director of Industries is not empowered to carry out any scheme which appears desirable to him. The whole thing has to be submitted to the Local Government, because the financial power is in the hands of the Local Government.

Q. Whether it is a proposal of the Director or the Board, the Local Government would be called upon to examine the whole thing and pass final orders? You do not contemplate that the Director of Industries should have any power to spend any money without going up to Government?—*A.* Money to be advanced for the purpose of helping an industry is distinguishable from money which has to be spent for the purpose of investigation or experiment.

Q. In the matter of investigation you would give the Director power to spend the necessary amount out of the budget sanctioned?—*A.* Yes.

Q. In the matter of affording financial help you would recommend that his proposals or recommendations should go before the Government for final orders?—*A.* Yes.

Q. You say in answer to question 64, "If such an Imperial department is constituted on the lines indicated and properly equipped there would in general be no need of provincial departments"?—*A.* Yes. The reason why I have felt it necessary to curtail the provincial programme is the need to prevent the unnecessary duplication of machinery, and also because if you have a department like that in each province, it will be necessary to have several experts for each. Without a properly equipped department supplied with suitable and sufficient experts it would be of no use merely constituting a department. Then, again, most of the questions to be dealt with have application to more than one province. Provided there is a properly equipped institution for the whole country where investigation, research and experiment are carried on, I think there would be no immediate need, at any rate, for a separate provincial department for each of the provinces.

Q. Do you think that the Imperial scientific and technical department will be sufficiently easily available to those who may wish to embark on industries, to meet the industrial requirements of the provinces?—*A.* It ought to be.

Q. Don't you think that distance will be a disadvantage?—*A.* No.

Q. You say, in answer to question 97, "Railway lines pronounced to be necessary two decades and more ago and which were set down as sanctioned projects and which for several years and even now are so mentioned, yet remain to be constructed." Could you name some?—*A.* Yes. The Hingoli-Basim-Akola Railway appeared more than 25 years ago as one of the sanctioned projects. In the famine of 1899 to 1900 earth work was constructed, and yet all that has been allowed to be washed away. I raised the question in

Council in 1911 and again in 1912 and an assurance was given to me by the President of the Railway Board that this was one of the projects which were intended to be taken very early in hand.

Q. And there is no visible sign yet of this project receiving any attention?—*A.* Yes, it is so. Apart from the war, there have been projects of questionable character which have been carried out.

Q. You say, "Lines the need of which was not obvious to the general public and which after construction have not worked satisfactorily have received preference?"—*A.* It is very well known in this province what I am referring to. There are lines in this province which cannot pay their expenses and in which only one train is run during the 24 hours. That line is in connection with the Bengal-Nagpur Railway. I forget the name just now. I shall send the name to the Commission.*

Q. You make a very justifiable complaint about the inequalities of railway freights in regard to industries. Have you any definite proposal to make to remedy or obviate such inequalities?—*A.* In regard to this, I have first of all, stated that there should be no differentiation in rates in regard to consignments to port and consignments from ports on the one hand, and consignments from one inland station to another inland station on the other hand on the same kind of goods. Cake sent from Akola to Nagpur is charged Rs. 9 per ton. From Akola to Bombay it is Rs. 8 a ton. The distance from Akola to Bombay is 363 miles. The distance from Akola to Nagpur is only 158 miles and the charge is Rs. 9. I can give numerous such cases.

Q. Do you think that this arises partly at least from the fact that railways are managed by companies? If the State took over the management of the railways it would certainly lay down equal and equitable rates?—*A.* Yes.

President.—Q. What is the reason of these rates?—*A.* They allow what they call waggon rate from Akola to Bombay, but it is not allowed from Akola to Nagpur, even though you may send hundreds of waggons.

Q. Can you give any explanation for it?—*A.* Unfortunately the policy on which these tariffs are based is not published in India, as it is done in America, I understand.

Q. This question has been discussed at the Railway Conference and there must be good reasons for it?—*A.* The fact is there.

Q. Have you had any actual explanation from the Railway Company?—*A.* We had a communication from Mr. McWatters, and I in reply pointed out the unequal and differential treatment meted out to inland trade. In reply we were told that that was a matter which could not be remedied, and beyond that there was no explanation vouchsafed.

Q. Is it because the returning truck will not be able to get any business and will have to come back empty?—*A.* Considering what a large export trade exists in the case of Nagpur, I do not see why there should be any fear.

Q. The waggon has got to come back to Akola empty?—*A.* In that case there is considerable trade also between Akola and Bombay. If Akola was a place which was doing only one kind of business there would be some ground to think that there might be loss. I believe after Bombay, Akola is the fifth or the sixth place on the Great Indian Peninsula Railway which has a very large traffic. We were prepared even to tell them beforehand how many waggons we would require and on what dates, and even that has not been considered as a sufficient thing. But the fact stands out prominently that there are facilities given for articles which have to go to port and they are not given for articles sent to inland towns.

Q. That, of course, one knows in a general way, and the usual reason given is that there is a big continuous trade with the port and waggons are loaded bothways, but for inland journeys it is not so. One is wholesale trade and the other is retail trade? Would not that vary with different places?—*A.* If it is shown that there are places between which there is considerable traffic this argument would vanish.

You think in the interests of trade, in order to remove this impression of inequality of treatment the railway should, in every case where representation is made, either give reasons for the rule that exists or modify it?—*A.* Yes.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. About these cotton ginning pools, don't you think that wherever in a chief centre pools exist, they start Gins in the interior and gradually the pool breaks?—*A.* The breaking of the pools is not quite so much by factories being established in villages and places where there exists no combination. To my knowledge, they have come to an end more on account of one of the big factory owners looking only to his own interest—of course, he is justified in doing so—and refusing to join the combination.

Q. Because people who have got their own ginning factories trade by it and they do not want to enter into the combination as they do not benefit by it and have to give their share of profits to others?—*A.* Yes. But many of them are now learning another kind of lesson.

* Not received at the time of going to Press.

Q. Suppose there is an industrial bank started to help industries, do you think it ought to have branches?—A. Yes. In centres of considerable trade and industrial activity.

Q. Can you mention any in your own place?—A. Yeotmal, Ellichpur, Murtizapur, Khamgaon, Mulkapur.

Q. Do you think that Government help ought to be given through the industrial bank or that the Government also should give assistance directly?—A. If the Government are going to establish a provincial industrial bank, in which the Government supplies one-third or a half of the capital, or else guarantees interest on capital, in that case the management and examination of projects and so on, should be left to the Industrial Bank, managed as it would presumably be by persons who themselves are good commercial men and who would have experts to advise them.

Q. And these experts you ought to have from the Government of India?—A. Yes.

Q. You think that if an industry is started with less capital than what is needed, the other capital should be provided by the industrial bank?—A. Yes.

Q. You do not start with full capital?—A. No, that is not what I mean. We should examine what was the reason of the deficiency of capital. The first thing which I postulate is that it is a sound concern and that it is a scheme which if properly financed will be beneficial. I do not ask assistance for concerns which are tottering or founded on wrong basis. I only ask help to be given to those which are really sound.

Q. Then you say that this assistance should be confined to concerns two-thirds of the capital of which is held by persons having their domicile in India, and the head office of which is located in India. Suppose there is a big industry like the chemical industry which requires millions for capital, and suppose a foreign company comes in would you still maintain that the concern should have its head office in India and the directors in India?—A. No. It is only a question of Government granting help to them.

Q. Suppose the Government give subsidies or guarantees interest. Would you object to it?—A. You say, a chemical industry the capital for which is mainly supplied by foreigners?

Q. Say a British company?—A. In that case there should be a condition that half of the capital at least should be raised in India.

Q. How could that be done?—A. If there is Government guarantee I am sure that people of India would be forthcoming to make investment in that company.

Q. If you say that half of the capital should be subscribed by the Indians, how can that be feasible?—A. If Government help is required, Government scrutiny and Government examination will become necessary and Government can easily ascertain if half the capital is Indian.

Q. Should Government allot the capital?—A. As I say, if Government help is to be given, the country might well say, that half of the capital should be raised in this country and from Indians and that on that condition alone the grant or subsidy should be given.

Q. As regards commercial museums, it has been suggested to us by some of the witnesses that in the commercial museums if you have samples of articles which are made in foreign countries from the raw products of India then that would be a great help to the people and it will give an impetus to the people and show them how raw material is taken from this country, manufactured in a foreign country and brought back into the country as a manufactured article?—A. I do not discourage the establishment of commercial museums, but considering the demands we are making upon Government, considering the demands that already exist upon the Government, I doubt whether commercial museums are of such an absolutely necessary character that they should be established everywhere.

Q. You are afraid about the cost?—A. Yes. There are more important things to be done. I believe by this time a good deal is known, for instance, as to where your iron ore is taken away, what are the various things which are prepared from it, where cotton is taken, what are the various things that are prepared from it. To that extent there is considerable knowledge not only among the educated classes but among half educated classes also. I have seen the Swadeshi stores of Bombay.

Q. Don't you think that Government should establish some stores like that?—A. That is a store for sale. I am at present only speaking of commercial museums.

Q. I come to sales agency. If the Government have a swadeshi stores like that, do you think it will encourage the people to sell their products?—A. Yes.

Q. Are you one of the members of the Board of Industries in the Central Provinces?—A. Yes.

Q. I want to know whether the Director of Industries should be under the Provincial Government or under the Imperial Department of Industries?—A. I should see him put under the Imperial Department of Industries.

Q. And should the Board be an Advisory Board?—*A.* Yes.

Q. About the technological research institute, you think that a time might come when each province might have its own fully developed institute?—*A.* Yes.

Q. Don't you think that if every province is to have its institute, there might be overlapping of work?—*A.* I have said that at present we should have only one Imperial research and investigation department, but if the work from a particular province is so much that it requires an organisation of another office either at the centre or in the province itself, then the best course will be to have it in that province. It all depends upon the expansion of industrial activity in that province.

Q. You don't think that in the beginning there ought to be a provincial institute?—*A.* No. Not in the beginning.

Q. About the technical and commercial colleges, don't you think that every province ought to have a technical college and a commercial college?—*A.* In regard to that, you know my humble suggestion before the Imperial Council was that we should have one polytechnic institute for the country in which every department of industry, take for instance marine engineering, railway engineering, mechanical engineering, electrical engineering, hydraulic engineering, should be provided for. The college need not necessarily be established in one place. You may have it in different places, Bombay taking up one part, Cawnpore another part, and so on. I say that provision should be made for higher instruction in the various applied sciences throughout the country.

Q. That is the central one. Don't you want provincial ones?—*A.* Below, in the provinces should come institutions where instruction for training up persons for the work of master supervisors is given, and below that comes the scheme of industrial and craft schools.

Sir D. J. Tata.—*Q.* The Industrial Conference has been in existence for over 11 years. Can you submit to the Commission a note as to the work you have so far succeeded in accomplishing in connection with that conference, about the influence which it exercises, and the results that you have obtained from it?—*A.* Yes, I shall send it to the Secretary.*

Hon'ble Sir R. N. Mookerjee.—*Q.* Following the question of Sir Fazulbhoj, do you think that your purpose would be better served if in the articles of association it was stated that preference should be given to Indians at the time of allotment?—*A.* The method which you suggest would meet the purpose as well. The point under reference is that Government aid is to be given to persons resident in India, whatever their race or creed may be, to develop the resources of India. That is the main object. I am one of those who think that even if you have to wait for 12 or 24 years for the development of a particular thing, it is better that it should be developed by Indians rather than it should become the property of private capitalists who are foreigners.

Q. Instead of making that hard-and-fast rule that two-thirds of the capital must be subscribed by Indians before Government gives any help, would it not be better, practicable and expedient that Government help should be sought and the discretion of allotting shares should be left to the directors, saying that preference should be given to Indians?—*A.* In regard to that the difficulty would be that Indians in parts of the country separated by long distances from the place where a company is started who may be willing to take shares, might not know the fact that Government is prepared to give assistance to that industry.

Q. How will you know in the other case?—*A.* Government help will be given if two-thirds of the capital is taken by persons resident in the country.

Q. If Indians are willing to do that, there would not be this Industrial Commission?—*A.* I beg to differ from you. What you suggest would not be sufficient.

President.—*Q.* I do not adhere to two-thirds and one-third?—*A.* I am prepared to put it half and half.

Hon'ble Pandit M. M. Malaviya.—*Q.* Your difficulty is that sufficient publicity may not be given. But assume that sufficient publicity is given by means of publication in the gazettes and newspapers, then the suggestion of Sir R. N. Mookerjee would, I take it, meet your object that preference shall be given to Indians?—*A.* There should be two things done. In the first place the scheme should not be blocked, and in the second place, every encouragement should be given to Indians to subscribe by their being entitled to preference. Don't you think that that would be a great stimulus sufficient to draw forth Indian capital?—*A.* The question of foreigners arises. Supposing there are five persons who are foreigners and five who are Indians, the Indians will receive preference. Supposing there are no Indians coming forward, my difficulty is this, whether Government aid should be given to a company consisting entirely of foreigners with foreign capital and whether it is to the benefit of the country.

Q. You make it a rule like the Japanese that none but a Japanese shall have a share in the Bank of Japan. You want statutory Indians and you include in that Europeans domiciled in India and others who come within the definition. So it would not exclude

* Not received at the time of going to Press.

Europeans from it? You only want persons who have a permanent interest in the country should be given a preferential opportunity to invest in the business of the country? That is your whole object?—A. Yes.

Q. Will not that object be attained by the suggestion of Sir R. N. Mookerjee?—A. In reference to that, may I put forward this thing. Supposing there is a large sugar industry to be established in the United Provinces, and supposing an American company takes up the project and says that they are willing to supply the capital and asks for concession from Government, the question is whether the Government concession in the way of bounty or otherwise should be given to that company if there is not a single Indian in it. That is the question and in regard to that my humble suggestion is that Government aid should not be given unless there is a substantial portion of the capital taken up by Indians.

Q. We quite understand your position that Europeans do not require any special fostering in the matter of enterprise. Your object in suggesting that two-thirds shall be reserved to Indians is to draw forth Indian capital. That is your object?—A. Yes.

Q. Will that object be secured by the chances of the success of an enterprise being increased? If you say that preference shall be given to Indians that will only mean that others may subscribe if Indians do not want to subscribe the whole capital. Suppose you have a big project requiring a capital of five crores, and you say that Indians may subscribe three crores and two crores by the people outside India. We require immense capital. That will ensure that preference shall be given to Indians and it will also ensure that if we cannot raise the necessary capital the capital might come from outside?—A. My scheme contemplated this. The concession which I asked to be given was in the way of Government taking shares or giving bounties or grants-in-aid, or specially guaranteeing interest and such things. It was in regard to these that Government help would come, and this not before the formation of the company, but after the formation of the company.

President.—Q. Supposing you started a company with two-thirds of Indian capital, if some of the Indians sold their shares afterwards to foreigners, would Government withdraw their help?—A. To the extent of the proportion being two-thirds there may be a modification. I have already said that I do not adhere to the proportion of two-thirds and one-third. I am prepared to its being half and half. The main point is that the country's making sacrifice ought to be made dependent upon a substantial portion of the capital being taken up by its people.

Dr. E. Hopkinson.—Q. Suppose an English gentleman comes forward and asks an Indian to take up shares in his name and then the Indian transfers the share to him?—A. If the *benami* character of the transaction is established, it is voidable and at times void.

Hon'ble Pandit M. M. Malaviya.—Q. And there must be a legislation for it and there should be a provision that transfers like that ought to be recognised by the directors before it would be valid?—A. That is almost in every articles of association.

Hon'ble Sir R. N. Mookerjee.—Q. You in your position as Secretary of the Industrial Conference, as a member of the Local Council and the Imperial Council, have thought it fit to bring prominently before the eyes of the world the weakness of Indians, that they do not do this, and do not do that, but you suggest no remedy for it?—A. You are not right there. Have I not suggested a remedy for it?

Q. You say they do not trust you. What remedy have you suggested?—A. Indian capital is shy in regard to manufacturing industries. That is a fact which we ought to recognise. That is what you yourself have stated in your address in 1910 that Indian capital is proverbially shy and that Indians expect almost immediate returns for their money. That is one great difficulty which industries have to face in India. What I have said is only the same thing in other words. We are not, in that way, differing on principle. As to remedying this my plan is the only true remedy.

President.—Q. In case of further capital being called up for one of those companies, would you suggest that preference should be given to Indians, because if the company had been a success the Indians would naturally apply for capital?—A. Yes.

Q. Will you drop then this one-third to two-thirds proportion?—A. After all that (*viz.*, two-thirds) is a suggestion. The underlying principle is there that Government aid should be granted only on condition that the industry is essentially Indian. That is the principle that I wish to emphasise and that is the principle I wish the Government to accept. As to the detailed manner in which that principle is to be worked, that might vary under different circumstances.

Q. As a matter of fact, you would not find Government aiding any industry that was promoted by anybody except the Indians?—A. I hope so. Foreigners have no claim for special concessions intended only for Indians.

Sir D. F. Tata.—Q. Is it not your meaning that before the promoters of a company go to Government and ask for aid in the shape of guarantee of purchase and other things, they must have made some sort of arrangement as to finding that capital and they must know where they are going to get their capital and how much. Then you suggest that they

would go to Government and tell them "We propose to do such and such a thing. Will you give us concessions?" Then if the Government are satisfied that there is a fair amount of Indian capital forthcoming, they would give concessions?—*A.* Yes.

Q. Is that what you mean?—*A.* Yes. I still think that I do not differ from Sir R. N. Mookerjee on essentials.

Dr. E. Hopkins.—Q. You suggest that an industrial bank should have a large share capital?—*A.* Yes.

Q. And should make advances from their capital?—*A.* Yes.

Q. Do you suggest that the bank should take deposits?—*A.* I do not think they can take deposits, because deposits are generally for short periods. There might be long term deposits with it. If the bank is of a substantial character, there may be people who will keep deposits with it for long periods, the men who wish to live on interest. Such a bank as the one I propose cannot take short period deposits.

Q. You consider that the best way of Government retaining any control over an industry which it assists is by the appointment of a director?—*A.* Yes. But the supervision should, as far as possible, be confined to seeing that the management is efficient and honest, that is to say, the submission of monthly statements and audit.

Q. Do you suggest that such a director should be an official of the Government or should be nominated by the Government from the business community?—*A.* That I would leave to the Government. There are officials who combine official experience with a considerable experience of business methods. It should choose a good man.

Q. With regard to manual training you lay emphasis on drawing?—*A.* Yes.

Q. And I think that in reply to the Hon'ble Pandit you said some elementary science teaching would be necessary?—*A.* Yes. Drawing is the training of the eye and manual training is the training of the hand. I mean by manual training, carpenter's work, smith's work, etc., and what we do on paper with pencil or pen I call drawing.

Q. Don't you think that it is important to train the observational faculties as well?—*A.* I fully recognise it.

Q. How would you do that?—*A.* I would have drawing even in primary education. I see the difficulty of insisting upon the development of the faculty of observation in elementary education. I should be very glad if it could be done. I have worked out a complete scheme in detail and I have given due place to the development of the faculty of observation and of making experiments. My paper is in the report of the first Indian Industrial Conference.

Mr. A. Chatterton.—Q. You are interested in the question of boiled linseed oil?—*A.* Yes.

Q. Can you tell us why there are such large imports of this particular commodity into India?—*A.* Because the imported article still holds the market, and the indigenous article is not yet receiving its due meed of recognition.

Q. Is the indigenous article as good as the imported?—*A.* I have got the testimony of qualified men who have tested the two and said that ours is as good as the imported article.

Q. Who are the principal consumers of boiled linseed oil?—*A.* Railways, dockyards, engineering departments, private contractors and private persons.

Q. Have you approached the railway companies to try your oil?—*A.* We have tried with some companies. Railway companies call for tenders and so on, and on one occasion a tender was sent but it was not accepted and I do not know the reason of it.

Q. Has the Director of Industries assisted you in this matter?—*A.* No.

Q. Have you applied to him for any help?—*A.* No.

Q. You say that the hulls of cotton seed are used for paper making?—*A.* Yes. I found that out from Lamborne, Ennis and Encyclopædia Britannica. I indicate it only as a possible industry, and not as an industry which I have tried.

Q. Have you sent samples to the paper makers in Calcutta?—*A.* No. I have not yet gone for that industry. I only indicate the possibilities of cotton seed industry.

President.—Q. As regards the restrictions imposed by the policy of the Government on Ruling Princes investing in immoveable property, I suppose you are aware that Ruling Princes cannot be sued in a British Court?—*A.* Yes. The sanction of the Governor-General is necessary. But that is not the obstacle that is objected to. What is pointed out is that if on failure to pay the debt the property mortgaged is sold by public auction even then the State or its Ruler or his relation may not purchase it even if it is being sold for far less than its value and the amount of the debt secured. That is the serious difficulty I have mentioned in my note.

WITNESS NO. 142.

Mr. F. G. Westmorland, Engineer to Messrs. Ralli Brothers, Shegaon, Berar.

Written Evidence.

Training of labour and supervision. My experience of Indian tradesman, extending over 15 years, is that the best workers are those that have been trained up in engineering works, such as Messrs Richardson & Cruddas, Bombay, or men having natural mechanical instincts, like the Assari caste in Southern India, who have been taught by practical experience in small native works or factories where they have to work for their living. Next I place those Apprenticeship system and industrial and other schools. taught in Government schools of handicraft or at similar institutions, and lastly those trained in Mission schools. These latter, I have always found, very much spoiled and never know their trade properly. Those fresh from Government schools have a tendency to think themselves far superior to other tradesmen, demand absurd wages and seem to have been too much petted whilst being trained. Yet on testing their abilities I have generally found that they have not acquired a proper knowledge of their trade, are unable to do an ordinary fair day's work, and at the best can only be engaged at improver's wages. I have heard similar opinions expressed by many other employers of labour, and I think the faults in the training at these schools are due, in the first place, to want of a good practical man to teach up-to-date methods, and in the second to too short a period for the training. The Central Provinces School of Handicrafts at Nagpur have remedied the former by having an excellent European expert in charge, but are shortening the course of instructions to two years, which, I think, is rather a mistake.

In England it is considered necessary for every lad, working 54 hours a week, to work at least a five-year apprenticeship at all trades, and any time lost has to be made up afterwards before he is considered a properly trained journeyman. It is true that the Board of Trade will accept a three-year course of apprenticeship and one year at sea in charge of a watch to allow an engineer to be examined for a 2nd class certificate, but no respectable steamship company will accept less than a five years' apprenticeship before allowing an engineer to take charge of a watch, so really a five years' apprenticeship is required for all engineers. Yet in India, I find, technical schools for training lads give only a three years' or at the most a four years' course for teaching students to pass the 2nd class examination under the Boiler Act. If a five years' apprenticeship is necessary in England to teach a lad his trade, I quite fail to understand how it is expected to turn out good tradesmen in two, three or four years in India, especially as technical schools work much less hours than apprentices do at home.

The aim, I consider, of all such schools should be quality, rather than quantity, so as to turn out expert tradesmen as near as possible in efficiency, for both skill and quickness of labour, to the British workmen, so, if it is impossible to provide a full five years' apprenticeship at these schools, arrangements should be always made with outside firms of good standing to take the students on as improvers to complete their apprenticeship under practical foremen. Lads trained only for two or three years are bound to revert to old careless ways of working if they are not given the opportunity of such further improvement.

Mechanical engi- neers. In the Presidency of Bombay, the United Provinces and the Central Provinces with Berar, no engine driving a factory can be worked by steam without having in charge a duly qualified engineer, holding a certificate of competency under their respective Acts, according to the size and power of the engine. But in other parts of India, such as the Madras and Bengal provinces, no such laws are enforced, and in these latter districts frequently engines of over 2,000 B.H.P., driven by several large boilers at high pressures, work, day after day, mills where there are large numbers of hands employed, without having a certificated engineer on the premises. Also large factories are now working in India driven by highly complicated machinery, having their motive power other than steam but equally as dangerous, such as gas, water power generating electricity, etc., without a certificated engineer being in charge, and of this the law takes no notice.

Yet if certificated engineers are necessary to be in charge of steam-driven machinery in one province they are equally necessary elsewhere, and not only in charge of steam-driven plants, but also where other motive power is employed, for the protection of life and property.

The provinces which require engines to be in charge of certificated engineers hold examinations at their respective centres and issue certificates of competency, but there is no uniformity at all in these examinations. The Bombay Board of Examiners will not recognize certificates issued under the Central Provinces Act, or accept students who have passed through a three years' course at the Amraoti Technical Institute, or a four years' course at the Nagpur Engineering School. The Central Provinces Board accept the Bombay certificates, but require an engineer to go to Nagpur and pay a fee, upon which they give him a certificate under their Act, without examination. There is no uniformity either with regard to the nature of the examinations, which vary according to to the Board of Examiners who set the papers, with the result that candidates have to study up at least 6 different text-books and must be coached in all sorts of questions in

order to get through the verbal examinations, as it is not infrequent that these examiners put questions to candidates, not with a view of ascertaining their practical knowledge of engineering, but with the idea of failing them if it possibly can be done; therefore a 1st class certificate obtained under one Boiler Act may not at all bear the same value as one under another Act. It often happens that a man failing to pass at Nagpur goes to Bombay and gets his certificate there, then by paying his fee at Nagpur can get a Central Provinces certificate without further examination, or if he fails at Bombay he goes to Cawnpore and gets a United Provinces certificate, which both the Bombay and Nagpur Boards, I believe, will recognize, although as a matter of fact the examinations at Cawnpore are noted for being considerably easier to pass than those at the other places. But an engineer holding a Central Provinces certificate cannot be employed in the Bombay Presidency in charge of engines and must be re-examined there if he happens to get transferred to a factory in that province. A mechanic in another province, such as Southern India, where there is no Board of Examiners and working with owners who require a certificated engineer to be in charge of machinery, although this is not required by law, has to go to Bombay as the nearest centre to qualify.

Examinations for certificates under these various Boiler Acts are held in the vernacular as well as in the English language, and interpreters are generally employed to translate the necessary questions into the native language for the candidates and retranslate the answers for the examiners. This, in my opinion, is open to considerable fraud and should be done away with, especially for the oral examinations, at least for 1st and 2nd classes, as I have personally found men holding certificates whose knowledge of engineering certainly did not justify their passing the qualifying examinations and on inquiry ascertained that they had passed in the vernacular only.

A remedy for this unsatisfactory state of affairs is to be found by following the lines of the Board of Trade, which examines engineers and grants certificates of competency not only in England but in a good many sea-port towns in the British possession. They have sets of examination papers printed on arithmetic, elementaries and drawing, which are revised and added to from time to time from the head office in London, and a candidate knows that no matter whether he is examined in London, Glasgow, Bombay, Hongkong, or Sydney, he will have one of these papers on each subject given him to answer, therefore he has not to study six or seven different text books but only one which gives these papers, such as Reed's Engineers' Hand Book. He is therefore able to go direct from the engine room of his ship to the examination room with a fair amount of confidence, if he has been studying at sea in his spare time, that he will pass his examinations. The only part in which the examiners have at all a free hand is in the verbals, but even then a certain line of questioning is always followed with the view of ascertaining the candidates' practical abilities. So I consider all these examinations under the Provincial Boiler Acts should be standardized on these lines, as engineers in charge of out-of-way factories have very little time at their disposal to study for the higher qualifications and often remain content with their 2nd class certificate rather than incur heavy expenses in paying a coach or buying a lot of text books which they can ill afford, with the hopes of being lucky enough to hit upon the right ones, when in the examination room of these various Boards.

The Board of Trade examiners in all British Possessions are practical marine engineers holding Chief or Extra Chief Engineer's certificates issued by that Board and therefore are fully competent to examine candidates for such certificates. The Board of Examiners under the Bombay Boiler Act has always at least two marine engineers holding Board of Trade Chief Engineer's certificates, and the other members are generally Indian marine officers, or hold 1st class certificates under their own Act, but the other inland Boards, who probably are not so fortunately situated to secure the services of such engineers, consist chiefly of civil, railway and public works department engineers, who, in most cases, do not hold any certificate under their own Acts. Therefore, if the examinations were standardized throughout India on Board of Trade lines and made more independent of the actual examiners, the certificates resulting from these examinations would become of equal value and readily be made available throughout India.

I would therefore advocate reforms on the following lines:—

- (a) There should be a uniform law throughout India requiring properly certificated engineers to be in charge of all engines driving factories which come under the Indian Factory Act independent of their motive power and according to the B. H. P. of such engines.
- (b) The present examining boards should be done away with and a Head Board of Examiners established for the whole of India which would draw up examination papers on the lines of the Board of Trade and appoint two or more local examiners, who must be practical, suitable and certificated engineers (engineers holding Board of Trade certificate being given the preference), at various centres to hold the examinations and on their reports the Head Office would issue the certificates of competency. This Head

Board should also have full powers, like the Board of Trade, to withdraw or suspend such certificates if, after proper enquiry, they found that serious accidents had occurred through incompetency or carelessness of a certificated engineer. The Head office should also have power to deal with false certificates, misuse of certificates, etc.

(c) All technical schools throughout India for training students to qualify for the examinations under the Boiler Act be recognized by this Head Board, which would have them inspected from time to time, receive annual reports of results of the work, and, if necessary, revise the courses of study so that the passing-out certificates given to the students on leaving the school would be available at any centre of examination throughout India.

(d) Examinations for certificates of competency should be held only in the English language.

Oral Evidence, 16th December 1916.

President.—Q. You say, "Those fresh from Government schools have a tendency to think themselves far superior to other tradesmen, demand absurd wages and seem to have been too much petted whilst being trained." What schools have you had men from?—*A.* I have had men from the technical colleges in the Bombay Province. That was some years ago when I was down there in the P. & O. Dockyard; and a few up here. I found very much the same sort of thing.

Q. Have you had any recent experience of that kind?—*A.* Yes.

Q. You think that the men who are now turned out of the Victoria Jubilee Institute are any better?—*A.* I have not had any recent experience of the Victoria Jubilee Institute.

Q. Have you not had any men from the Victoria Jubilee Institute?—*A.* Not very lately; some time ago I had some, fresh from that school. After they knock about the world they lose that tendency to superiority.

Q. We are all like that when we leave college?—*A.* Yes.

Q. Do you think there has been any improvement lately?—*A.* I don't think from my recent experience there has been very much; at least not noticeable.

Q. The School of Handicrafts here has had a too short existence for you to judge?—*A.* Yes, you cannot judge from that.

Q. We were told in Bengal that there was no real call for these certificates of competency on the part of mechanical engineers and those in charge of boilers. The number of accidents had been so small that anything in the form of a certificate would not remove any real danger and that there was on the part of the people in Bengal no real grievance?—*A.* Very likely. If you have no certificated engineers, how can you tell about accidents?

Q. The Chief Inspector of Explosives thinks that the number of accidents is so small that there is no real call for certificates?—*A.* Why do the other provinces insist upon it?

Q. That is what we want to know from you?—*A.* The other provinces insist upon it, not only on account of life but on account of the damage to valuable property. An industry requiring an outlay of capital for machinery will not pay unless that machinery is kept in proper working order to give its maximum outturn at minimum working cost. To attain this object properly trained and certificated engineers are required to be in charge of it.

Q. You have a recognised standard?—*A.* Our firm would not have an engineer, unless he was certificated, in charge of a factory. They have something then to go on.

Q. You think the examination ought to be made more uniform and controlled through the whole of India, *i. e.*, a uniform standard?—*A.* That is my idea.

Q. You have pointed out certain occasions on which the actual regulations can be dodged?—*A.* It is ridiculous. I would have the whole on a uniform standard.

Q. Do you get many accidents due to the inefficiency of the man in charge of the boiler or engine?—*A.* We don't, because we have certificated engineers always looking after them; but I have heard of many accidents in the case of engineers without certificates.

Q. It is rather significant that where they have no certificated engineers, the number of accidents is negligible?—*A.* I cannot say about Bengal. My experience some years ago in Southern India was that there were constant accidents happening to machinery and boilers on account of not having certificated engineers in charge. There were no accidents reported to Factory Inspectors, but they were nevertheless there.

Q. Apart from accidents, there is a certain amount of degeneration of the machinery?—*A.* Yes.

Q. Does this standard of examination result in the men working up their profession in such a way that they would become of greater value to you?—*A.* Naturally they get educated, as they would have to learn a certain amount of technical things, and are better men for having learned it, unless they learned it off like parrots.

Q. You look upon Madras and Bengal as the two backward provinces?—*A.* I do.

Q. They have engines of over 2000 H.P. driven by men without certificates?—*A.* I have seen that very often.

Dr. E. Hopkinson.—Q. Is it the practice in India to insure boilers against accident?—*A.* Against accident? No, I don't think they do, not as a rule. I don't think any insurance company would take it up. It is not like it is at home where they insure against accident and insist upon the engineer being properly certificated.

Q. The home companies do not extend their operations to India?—*A.* They certainly do not to my knowledge.

Q. Would you suggest that it would be a desirable thing if the Government of India set up some machinery for examining the boilers themselves?—*A.* They do examine the boilers themselves every year. The Senior Inspector of Boilers and the Junior Inspector of Boilers do that throughout India, including Madras and Bengal.

Q. What officers of Government carry this out?—*A.* Inspectors of Boilers they call them.

Q. You say Bengal and Madras are exceptions?—*A.* They have Inspectors of Boilers, but not certificated engineers in charge. They only put half the Act in force.

Q. Do you consider the Government Inspectors efficient?—*A.* I don't trust them myself, and generally go and see to things myself; but still I think them generally efficient.

Q. In case a boiler explodes, is there a Government enquiry?—*A.* Yes, always.

Q. And if there is any fault attributable to the owners, how is that brought home to them?—*A.* It would be brought home if they had certificated engineers, by suspending their certificates, *i. e.*, if an engineer had a first class certificate, they would give him a 2nd class. If he had a 2nd class they would take it away for six months, as they do at sea.

President.—Q. Is it brought home to nobody?—*A.* How can you bring it home to the owner? He pays for the expenses of the enquiry, and that is all. At home they are fined.

Dr. E. Hopkinson.—Q. You are acquainted with the work of the Manchester Steam Users' Association, which is an association which does not exist for profit, but for promoting the proper inspection of boilers. Do you think there is need for such an association in India?—*A.* I don't think so, because they don't make boilers in India. They get them out from home. You get the Leeds or Manchester certificate which is accepted out here.

Q. Do you consider that the inspection here in India is done efficiently by Government?—*A.* Yes; at home it is not done by Government; it is done by the insurance company.

Q. The examination which you refer to applies only to the men who are attending boilers; it does not apply to men who are attending steam engines?—*A.* It applies to both. It depends on the size of your engine, what class of engineer you require. Up to a 60 H.P. engine you want a 2nd class, over 60 a first class.

Q. Is that a rule in the Central Provinces?—*A.* Yes, and in most of the other provinces.

Q. Do you consider the system ought to be extended to other classes of machinery?—*A.* I think it ought to be extended to gas and other power plants which are just as dangerous as steam or more so. There are a good many gas plants in India, but I would restrict it to prime movers.

Hon'ble Sir R. N. Mookerjee.—*Q.* With reference to sub-paragraph (d) at the end of your written evidence "Examinations for certificates of competency should be held only in the English language"; do you include all the common native Tindals who work boilers; should they be compelled to pass an examination in English?—*A.* Not to work the boiler, but the man in charge, he must be a certificated engineer.

Q. In Bengal lots of the big steamers are plied by Indians from Goalundo to Assam. They get Rs. 100 and Rs. 150 pay, but they don't know English?—*A.* Then they don't pass any examination.

Q. Oh yes, they pass examinations, and are competent men. They are captains; only because they don't know English they are called something else?—*A.* They must have a special arrangement by which they are given a special examination under one language. We have a dozen different languages; how can you expect these men to pass.

Q. On these light railways all the drivers are Indians. They don't understand English, but they drive their engines all right. They are certificated?—*A.* Then you must have special arrangements for examining them.

Q. Then you don't make it compulsory that every man must pass in English?—*A.* Every man who passes these present examinations.

Q. But how about these light railways?—*A.* They must make special arrangements. There is no special examination; it is only this examination which every one must pass.

Q. I know of light railways over thousand miles, but have never heard of an accident for want of the driver not knowing English?—*A.* You must have special arrangements for examining these men.

Mr. C. E. Low.—*Q.* How many hands have you got in your Shegaon workshop?—*A.* About 18 to 20.

Q. Do you take any apprentices in?—*A.* Yes.

Q. Where do you get them from?—*A.* They are generally sons of some of our old men, our old foremen.

Q. What education do they get before they come in?—*A.* Some get a better education than others. Some of them have passed, and others have only studied up to the 4th and 5th standard; others the 3rd standard.

Q. Most of them have got a vernacular education?—*A.* Yes.

Q. Do any of them know English?—*A.* A few.

Q. Have they had any previous technical training at all?—*A.* No, they just come to me straight from school.

President.—*Q.* If they don't know English, they could not qualify for this certificate of yours?—*A.* No, they certainly could not. I am taking them as mechanics, not as engineers.

Q. You are not taking up men of the kind that you contemplate who would take this first class certificate?—*A.* I don't give them any theoretical knowledge. I only take them up as mechanics, to become turners and fitters.

Q. Are there any facilities at Shegaon for them to get training?—*A.* No, they would have to go to Amraoti. I generally recommend one or two to go to Amraoti.

Q. Are you on the Board of the Amraoti institution yourself?—*A.* Yes, I am.

Q. Do you send on any of your apprentices for training?—*A.* I have not so far. I have it in mind.

Q. Your apprentices don't pay a premium?—*A.* No, we pay them; we start them on Rs. 7 a month.

Q. They are not exactly apprentices?—*A.* No, we don't bind them. We call them apprentices and give them Rs. 7 a month. We keep them for four or five years, if they stay and turn them into workmen.

Mr. C. E. Low.—*Q.* Can you tell me what kind of men are coming to the Amraoti Institute?—*A.* They are very well educated. They know their theory very well. We have three engineers now whom I have taken on lately from Amraoti Institute.

Q. They have nothing, but their Amraoti training?—A. Yes, and a year afterwards Mr. H. D. Coggan, practical training.

Q. How long have you been on the Committee?—A. About 4 years.

Q. Previous to that, there were no technical men on the Committee?—A. No, there were only the Public Works Department engineers.

Q. Do you think the appointment on the Committee of technical men will have a good result?—A. They seem to think I am a benefit.

Q. What share do your Committee take in making the training more practical?—A. We are taking in outside work, repairing for the surrounding factories. They are now getting a good deal of outside work.

Q. Have you a good number of Brahmin boys?—A. Yes.

Q. Do they shape all right?—A. Yes, I have got two of them as engineers. With a little practice they will make quite good engineers.

WITNESS NO. 143.

Mr. H. D. Coggan, Chairman of the Central Provinces and Berar Mining Association, Kamptee.

Written Evidence.

I have the honour, as the selected representative of the Central Provinces and Berar Mining Association, to give my opinion on such matters referred to in the list of questions as concern the manganese mining industry of the Central Provinces.

These rules as applying to the manganese mining industry have as a whole worked satisfactorily, and such suggestions as I now make are with a view to the enlargement of their scope as regards exploration and the encouragement of prospecting on a larger scale than appears to be possible under the rules in their present form. Mining and Prospecting Rules, 1913.

I would suggest that the old form of exploring license should be restored, with modifications, giving the holder the exclusive right to a prospecting license or a mining lease over any portion covered by the license. Exploring licenses.

Although under the existing rules there is no limit to the area which may be granted under a prospecting license, it is stated that it will be restricted to such an extent of land as may be reasonably required for *bona fide* prospecting purposes. Under the old rules it is laid down that in the case of manganese ore no concessionaire will ordinarily be granted an area of more than 5 square miles on a prospecting license in any one district, so that in determining the area to be granted under the existing rules the procedure would probably be influenced by this principle, and it is scarcely likely that more than say ten times the originally specified area would be granted. Even this would not be sufficient for the object in view, which is to afford greater facilities for prospecting on a larger and more scientific basis, for no capitalist would embark on operations necessitating the employment of a highly paid staff necessary to thoroughly explore a large area unless they were assured of protection against the fruits of their enterprise being reaped by others who may be watching their operations.

I have suggested above that an area of even 50 square miles would not be sufficient encouragement for prospecting on a large and scientific basis, and this applies not only to the wilder and hitherto unexplored parts of the country, but to those in the vicinity of well-known deposits, for it must be remembered in connection with the latter areas that all out-cropping deposits have already been taken up, and the discovery of any that may lie below the surface would entail boring with skilled labour and scientific knowledge to direct it. In view of the expense involved in such operations, I do not think that concessions extending over 100 to 500 square miles would be unreasonable, and even were it possible to grant such areas under a prospecting license, the surface fee leviable, and which varies from 1 anna to Re. 1 per acre per annum, would be prohibitive.

It may be contended that the adoption of my suggestion would mean the degeneration of an exploring license into a prospecting license, but I do not propose that the former should carry with it the same privileges as the latter, *viz.*, the liberty to remove ore up to a quantity which may, at the discretion of the Commissioner, extend to 10,000 tons with the resultant surface disturbance, but that an exploring license should restrict operations to

purely exploring work such as the chipping of the surface of rock with a hammer and boring, which does not involve any serious surface disturbance, and to the removal of only such quantities of mineral as may be necessary for specimens, or samples for analysis, at the discretion of the local authority.

As regards the fees to be charged for such licenses, I think that they should be as moderate as possible, but that a substantial security deposit should be demanded to deter unsuitable persons from applying for them.

The length of time for which such licenses should be granted may be governed by the nature of the country to be explored and the probable distribution of minerals therein.

The adoption of the form of license suggested may also be the means of encouraging the search for minerals in Native States, where the need for the grant of larger areas for the purpose is even greater than in British territory, and where, owing to the mining policy being to a great extent modelled on that of the Government of India, concessions for large areas are not always obtainable.

The "pegging out" of claims.

The system of "pegging out," although provided for in the Mining Rules, has not yet been brought into force in the Central Provinces, and I would suggest that this should be done and made applicable to concessions for all minerals to avoid the possible loss of a portion of or even the whole of a valuable deposit through an error in preparing a plan, although the claimant may have gone to great expense and trouble in proving it. Such cases have occurred in these provinces.

Prospecting licenses.

Under the existing rules, a concessionaire who has already held a prospecting license over any particular area for the full period of three years, including the extensions permissible under the rules, cannot be granted a prospecting license over the same area or any part thereof should he apply for it at any subsequent time. This bears hardly on a concessionaire who, having already prospected such an area to the best of his ability in the time allowed him, takes up a portion of it under a mining lease and finds as a result of his subsequent mining operations that the deposit extends beyond his boundaries but not with sufficiently definite indications to justify his applying for an extension of his mining lease. Unless he is prepared to take up a further area under a mining lease and to pay dead rent on land that might eventually turn out to be barren, he is debarred from further prospecting the area surrounding his mine, in the light of the knowledge and experience gained by operations conducted by him under his mining lease. I would, therefore, suggest that the grant of a further prospecting license to a concessionaire over an area that has already been held and relinquished by him should be made possible, provided that he has taken up a mining lease therein, worked it to the satisfaction of the Local Government, that a period of say one year has elapsed since the expiry of the original prospecting license, and that there is no other applicant for it at the time.

Land policy.

Considerable difficulty has been felt in the operation of section 151 of the Central Provinces Land Revenue Act. This section as it stands at present does not confer on Government the power to enforce entry on private land under which no part of the mineral lies and Government therefore are unable to grant extensions of mining leases over land that may subsequently be found to be essential for the proper development and working of a mine, such as the disposal of waste. I understand, however, that the amendment of the law in this connection is under consideration, but I mention the matter as it has an important bearing on mining interests in these Provinces.

Acquisition of land for light railways and tramways.

I venture to suggest that provision should be made for the acquisition, on behalf of private individuals or companies, of land required by them for the construction of light railways or tramways for the transport of mineral to existing railways or waterways, provided that the importance of the mineral and the interests involved justify it.

Railway freights.

The recent enhancement of freight on manganese ore is viewed with considerable anxiety. Under present conditions when there is no competition with foreign sources of supply, exporters are able, as in the case of sea freights, to pass the increase in railway freight on to the consumer, but when normal conditions are restored and foreign competition resumed, it will place exporters of Indian manganese ore, at a serious disadvantage and make impossible the export of the lower grades of ore of which a considerable quantity has been exported in the past, and of which a much larger quantity must in future be exported if the anticipated demand for this mineral is to be met. Although the railway authorities will no doubt follow the course of events and make such adjustments in the rates as may be necessary in order not to hamper the industry, it is a matter of such vital importance that I venture to draw the attention of the Commission to it.

Training of labour and supervision.

As far as the supervision of mining operations is concerned, I do not consider that the need for trained subordinate staff has yet made itself felt. These operations are generally conducted under the supervision of mining engineers trained in England, with the assistance of Anglo-Indian or Indian subordinates who usually receive on the manganese mines themselves the short practical training necessary to qualify them for their duties. Beyond this, so long as the extraction of manganese ore is confined to open cast working—and underground mining for this mineral is a remote contingency—no higher form of

training is called for. It is, however, in regard to mechanical labour and supervision that a want has been felt, a want that is likely to grow as the mines get deeper and the adoption of machinery for pumping and haulage becomes more general, and it is in the training of such labour that Government assistance would be valuable.

There is at present a Government School of Engineering at Nagpur under the control of the Department of Education, which has the essentials of great utility provided its scope can be enlarged. Its character at present is, I understand, purely educational, and the opportunities afforded the students for gaining the practical experience necessary to fit them for employment in industrial enterprises are extremely limited. This, it appears to me, might be remedied by giving the school greater facilities for taking in work from mills, mines and other available sources, than it has at present owing to the small number of experienced workmen it employs, thus giving the students greater opportunity for studying practical methods from more experienced workmen. The school should also be able to send students out with experienced workmen to attend to jobs at mills and mines, thus giving them a more intimate and practical knowledge of the requirements of the industries in which they are likely to find employment in future, so that while assisting these industries themselves the income from such work would probably make the institution self-supporting, or in any case assist Government in carrying out the additions in *personnel* and *materiel* that would be necessary to increase the scope and efficiency of the school.

I venture to suggest that the interests of an institution conducted on the semi-commercial lines indicated would be better served if it were placed under the control of the Department of Industries, which is in closer touch with the industries of the province than the Department of Education can be expected to be, and which has a more intimate and practical knowledge of their requirements. At the same time I would advocate nothing that would deprive the institution of its educational value.

Oral Evidence, 16th December 1916.

President.—Q. You say 'under the existing rules a concessionaire who has already held a prospecting license over any particular area for the full period of three years including the extensions permissible under the rules cannot be granted a prospecting license over the same area or any part thereof should he apply for it at any subsequent time.' What rule are you quoting? It cannot be the Government of India rules?—*A.* It is one of the rules provided for the grant of prospecting licenses according to which a license is granted for one year by the Collector in the first instance and renewed at his discretion for a further maximum period of two years.

Q. That rule does not prevent anybody from applying for the same land again unless you put into it a meaning that was never intended. As I see the rule there is nothing excluding the man from applying at a subsequent period?—*A.* It does not seem so from the wording of the rule but in practice that is not the case.

Q. A case of that kind ought to be brought to the notice of the Government. You suggest that provision should be made for the acquisition of land for individuals or companies for the construction of light railways and tramways. In a case of that kind would you make these light railways a public thoroughfare or only for the use of the company itself?—*A.* I should make them public thoroughfares as far as the carriage of the minerals they were originally intended for are concerned.

Q. Or anything which is appropriate?—*A.* It is a question of rolling stock, as stock suitable for minerals would not be suitable for such commodities as grain or timber. In the case of a tramway my company constructed about 10 years ago, Government could only let us have the sides of the public road and Government Forest land free. They could not help us to acquire land for diversions from the public road where they were necessary through privately owned land. We had very great difficulty in obtaining land for this line.

Q. Would that line have been of any use to the public in carrying from other mines for instance?—*A.* It was actually used for carrying manganese ore from all the mines in the Bhandara District and some in the Balaghat District.

Q. That would be a case where the Local Government could have exercised its power under the Land Acquisition Act?—*A.* It was regarded as a private tramway from the beginning and Government said they could not help us. It made Tumsar Road Station on the Bengal-Nagpur Railway the largest manganese exporting station in India and perhaps in the world. We carried nearly two-hundred thousand tons of ore per annum. The line eventually turned out to be of great public utility and it has now been purchased by the Bengal-Nagpur Railway.

Q. It has now become a public line?—A. Yes.

Q. One can understand the objections that may be raised in the case of the Land Acquisition Act being used to acquire land for one private company but if the line is serving other companies and is of obvious public utility the Local Government would interpret the rules generously?—A. We stated in our original application that we were prepared to carry ore for other companies on the same terms as our own, but Government did not apply the Land Acquisition Act.

Q. Regarding your point about the freight of manganese—is it only a war measure?—A. We hope so, but the reasons given by the Bengal-Nagpur Railway were that the existing rates did not pay their railway for the trouble involved in this traffic, on account of the short leads over their own railway. The Railway Board, however, gave us the assurance, when we protested, that the railway would no doubt follow the course of events and make such re-adjustments in freight as may be necessary in order not to discourage the traffic.

Q. You are a little happier over that vague promise. Do you know why the pegging out system has not been adopted in the Central Provinces?—A. Since sending in my written evidence I have found a letter from the Secretariat giving the Chief Commissioner's reasons for not adopting the pegging out system. This letter appears to have been lost sight of in the records of the Mining Association. Had I been aware of its existence I would have referred to the reasons given.

Q. Does that letter give fairly substantial reasons to the satisfaction of the Association?—A. I think the difficulties anticipated there might be overcome.

Q. What were the difficulties anticipated?—A. The principal difficulty was that pegs or other marks might be altered or obliterated by a rival prospector and that such an act could not in the present state of the law be made a penal offence.

Q. Could not the prospector have his certificate of approval cancelled? The certificate of approval is better than any legislation that could be devised. Any defaulter would have his name struck off in the next year's list?—A. Yes. I think that would be a sufficient deterrent.

Q. Do you think then that the time has arrived when the Local Government ought to declare in respect of any specified area the system of pegging out claims. Do you think it would be an advantage to the mining community in the Central Provinces?—A. Undoubtedly it would be.

Q. Is that the view of your Association?—A. Yes.

Q. You want the areas that are usually given out for prospecting to be increased. Don't you think that people will take up more areas than they can manage and that they should be made to pay a corresponding rate, to act as a deterrent in the case of persons who do not intend to really prospect?—A. A heavy security deposit would have the effect of keeping out any but *bona fide* prospectors.

Q. If any area is taken up for prospecting there is nobody in the world who can say whether that is a justifiable prospecting proposition or not until it is actually prospected and that cannot be under one year plus two extensions. The land might be held up against the honest worker for something like three years?—A. It is certainly a danger that has to be reckoned with, but if Government would use more discrimination as to the persons to whom such licenses should be granted I think that danger would be removed.

Q. Discrimination of that kind means the discrimination of the District Officer. That will introduce a difficulty; if discrimination is exercised very carefully it will mean considerable delay in obtaining licenses, and as you know the principal complaints made against the old rules were practically due to the inordinate delay in obtaining licenses. If you increase the machinery for investigating the man's *bona fides* you introduce an opportunity for delay. Do you think there is a compensating advantage in your proposal?—A. I do not think that there would be any serious delay if this discretion is given to the District Officer. In any case a very large area would be necessary before any one would undertake the boring operations that would be necessary on a large and expensive scale to ascertain whether any deposits existed in the areas I have in view.

Q. In a case of that kind, which is exceptional, the Local Government has power to extend the area to anything it likes?—A. Yes, but under the existing rules a surface fee ranging from one anna to one rupee an acre per annum is chargeable and in the case of a large area this would be prohibitive.

Q. Don't you think that by a levy of this kind you prevent the speculator and keep him aloof. A rent of this kind would force the man to discriminate between good and useless ground, that is to say, it would be taken up only by professional men and not speculators?—A. In the case of certain areas it would be very difficult to exercise such discrimination and considering the large area over which mineral is distributed in the Central Provinces I think it would be a heavy tax, in the case of manganese ore especially.

Q. Don't you think there will be a danger that one particular company might get the practical monopoly of all the minerals?—A. In considering the grant of such concessions due regard may be had to the distribution of mineral in the area applied for and they should apply only to areas where deposits are probably at a considerable depth below the surface.

Q. Will you send us for confidential consideration the description of the particular ground that you have in mind?—A. Yes. (*Witness subsequently sent a communication on the subject which is confidential.*)

Q. We quite understand your difficulty in giving any more particulars just now because that would affect the objects which the Association has in view. Speculators may come in and take up the land and sit upon it?—A. I do not think speculators would want to take up the land if there was a very heavy security deposit. That will have a deterrent effect.

Q. Security deposit is the cheapest thing in the world. You have only to hand in Government paper and you are earning interest all the time?—A. It might be stipulated that the deposit should be in cash.

Q. That would be very hard?—A. That is where the deterrent effect comes in.

Q. You say that it is very difficult to pay from one anna to one rupee an acre and yet you want a deposit in cash?—A. A prospecting license for three years over 100 square miles would, if only two annas per acre were charged, mean a surface fee of Rs. 24,000. That would prevent people from prospecting at all.

Q. If a company wants one hundred square miles to prospect for one mineral it must be a fairly gluttonous company. It is probably keeping some body out?—A. It is only reputable people that should be granted such a concession, but if it means payment of Rs. 24,000 as a premium merely to be allowed to prospect an area, no one would think of paying that sum. There are areas without any surface indications which might pay to prospect and I think ought to be prospected.

Q. By expensive boring?—A. Yes.

Q. Do you mean to say that after the boring is done at the expense of the company and there is an indication of the nature of the land then other people would come in and reap the advantage?—A. Yes. I mean that a sufficiently large area would be necessary to secure to the prospector the fruits of his enterprise and prevent others who may have been merely watching his operations from coming in and reaping the benefits.

Mr. C. E. Low.—Q. I understand that what you have in mind is that over fairly extensive areas all visible deposits are being worked, but there are probably others on other parts of the same horizon which are below the surface and so it requires deep boring to find out the ore. In that case you would not require a mining lease for the whole 500 square miles or whatever it is but only for a reasonable number of propositions?—A. That is my idea. Manganese ore is distributed over a wide area. It is not in continuous bands for any great distance.

Q. Do you think that this is a case in which Government itself should put down the borings?—A. I see no reason why they should not.

Q. And then who would have the benefit?—A. They might give it to the highest bidder.

Q. Do you admit Indian members into your Association?—A. Yes.

Q. How many?—A. About half the members are Indians.

Q. You think it is an advantage to your Association to have Indian members?—A. I think it is a decided advantage.

WITNESS NO. 144.

*Mr. W. Wight, Textile Expert, Central Provinces, Kamptee.**Written Evidence.*Financial aid to
industrial enter-
prises.

Q. 1.—While employed by the Congested Districts Board for Ireland as a weaving instructor in congested districts I had an opportunity of noting how the fishermen were enabled to become shareholders in fishing luggars, value £300 each or so. Each boat had a crew of six, one being a nominee of the Congested Districts Board.

The six had each one share in the boat, as regards division of profits from sale of each catch, after all expenses had been met, such as repairing boat, barking nets, interest on capital, etc.

The Congested Districts Board for Ireland, however, did not pay the profits from sale of catch to the crew at once, in the proportion of 1/6 each, but divided the total value into eight parts, paying each man 1/8 and withholding two shares to redeem the capital.

In this way many crews became joint owners of the boats after a season or two of good herring-fishing.

The boats remained the property of the Congested Districts Board until total cost of each boat was paid up by the 25 per cent of profits accumulating in the hands of the Congested Districts Board; when the boat was clear it was handed over to the crew.

Government control.

Q. 6.—So long as the boats were the Congested Districts Board's property the crews were treated as employed crews, being under direct control of a Congested Districts Board's Fishing Inspector, as a fleet of herring fishing boats. The fleet moved to the various fishing grounds under his orders. This Inspector also saw that boats and fishing gear were kept in a proper state of repair, stores being issued such as paint, etc., as required and charged to each individual boat.

Technical aid to
industries.

Q. 15.—When I was employed by the Congested Districts Board for Ireland as a weaving instructor in congested districts, my duties were to train weavers in the use of improved hand-loom, producing Donegal tweeds. This work was done by erecting improved looms in different districts and teaching young men how to work them, then moving on to other districts as required.

The cloth woven by weavers in Donegal was all sold at fairs held in different centres (once a month in each centre).

The Congested Districts Board measured all the cloth displayed for sale at each fair to save friction between buyer and seller, and I had full charge of a staff employed for that purpose. While employed in different districts I had opportunities of noting the methods employed in teaching carpentry by the Congested Districts Board. An instructor moved about from district to district forming classes of young men and giving instruction how to use tools, making ordinary farm appliances, also tables, chairs, stools and other things used in cottages.

There were lace and knitting instructors also. The lace instructors formed classes in their different districts, gave instruction in lace-making and were expected to dispose of work done in classes by either calling on and showing the work to wholesale houses in Belfast and Dublin, or sending samples by post all over the United Kingdom. The pupils were paid a scale of rates for the different articles made, and instructors were expected to make their classes self-supporting from profits on sales made.

The knitting industry was not done in this way, as this industry was in the hands of merchants in various districts in Donegal, who distributed to the cottars yarn to be knitted into hand knit, sports coats, etc.

When a merchant wanted to open up a new district he applied to the Congested Districts Board for a knitting instructor to be placed in that district. The Congested Districts Board invariably complied with such requests, as it enabled the women in the district to become wage earners, thus raising the standard of comfort in the district.

Sales agencies.

Q. 30.—My experience of sales agencies is that they are not a success, as compared with any business having a whole-time paid representative. The reason is that sales agencies have many firms or businesses which they represent on a commission basis, and they are

apt to neglect any one whose goods do not sell readily and follow the line of least resistance by paying attention only to the ready selling article, as it means good commission with little trouble or expense. A whole-time representative paid by salary and commission must sell to justify his holding his position and earning his salary.

Q. 44.—I am at present employed by Government as a textile expert in the Central Provinces. My duties are to try and improve the efficiency and skill of hand-loom weavers in the Central Provinces by suggesting any improved methods or appliances whereby better work can be produced. Training of labour and supervision.

On arrival in the Central Provinces two years ago to take up my work I found that the weavers in no case used fly-shuttles and I at once saw that this was the first thing to devote my attention to, as the use of the fly-shuttle would enable the weavers to double their output as compared with their obsolete method of pushing shuttle through by hand. Before deciding on what form of improved sley to adopt, I visited Madras where the Industrial Department have been attacking this problem successfully for over twelve years. I found an excellent fly-shuttle sley in use there, of which they have introduced over 12,000 in twelve years. I decided, judging from my experience of looms, that I could not do better than introduce this sley in the Central Provinces, as it was cheap (cost Rs. 5) and could be placed on a native loom without any trouble.

I also found dobbies for working silk borders in use in Madras, without which fly-shuttle sleys cannot be adopted where fancy pattern borders are woven. I bought samples of sleys and dobby and engaged a weaving master familiar with their working, to come to the Central Provinces.

I have introduced over 50 sleys in the Central Provinces, instructing the weavers in their use. This may seem a small number, but there has been a lot of prejudice to overcome, also there has been some difficulty in getting sleys made in the Central Provinces to withstand the great changes of temperature as compared with Madras; these changes cause the wood in shuttle race to warp or twist. I have had trouble also in getting sleys made, as the price must be cheap, but have now got a contractor to supply on a fixed rate of six rupees each.

Dobbies.—I have introduced eight Buggri Kuttari dobbies so far, and they are giving every satisfaction; but have not yet got a good working model of Ruifull dobby in work. This pattern of border is very popular in the Central Provinces, but the arrangement of the pattern makes it mechanically more difficult in working.

I am still working to get a suitable design, and meantime I am pushing on the introduction of sleys amongst weavers of coarse material, who do not require dobbies.

There are various other improvements such as a warp beam, warping machine, etc., which also can be introduced; but as these do not apply so much to increased output, I am leaving them meantime until the weavers have become thoroughly satisfied with the advantages of the fly-shuttle sley, when they will be more willing to adopt other suggestions offered by me.

Q. 110.—I have been trained as a designer of woollen goods, and since coming to the Central Provinces, after seeing samples of wool grown here, I am satisfied that a good paying woollen industry could be started in the Central Provinces. General.

Under instructions of the Director of Agriculture and Industries I ordered a hand loom, suitable to weave woollen goods. I bought warp yarn from Cawnpore Mills, United Provinces, and have had local wool handspun into weft yarn by villagers, near Nagpur. I have woven samples of cloth from these yarns, and obtained a cloth similar to Donegal tweeds. This cloth could be sold as a handspun, handwoven tweed, suitable for sports coats, caps, ladies' skirts, etc.; as no dye is used, the colour would not fade under the Indian sun.

The cloth could be sold as cloth, or another industry could be introduced by engaging a cutter and dhurries and taking up the making of sports coats, caps, ladies' skirts, etc. I am sure there is a trade opening in this respect, if one considers the enormous number of Norfolk sports coats worn by the students and educated classes in India, many of which are a very cheap mixture of cotton and shoddy. The price paid for them is high, and the cloth I suggest making would be cheaper and with better wearing qualities.

I have been in touch with many firms in Scotland who have started making high-class ready-made sports garments from the same type of cloth with great success.

Oral Evidence, 16th December 1916.

President.—*Q.* You have only been out a couple of years?—*A.* Yes, two years.

Q. So far as you are able to say, have you got any grounds for hoping that you can improve the weaving school?—*A.* Yes, I have.

Q. Have you seen any signs of improvement?—*A.* Yes, all the people who have taken up the improvements I have suggested, have stuck to them.

Q. Do you find among the people that there is a sort of ambition to take up improvements?—*A.* You find different classes of weavers. Some don't have much ambition. We take a lot of trouble to get them to try these things, but they are prejudiced against them. Other weavers seem to be quite anxious and have taken to them, but not very readily.

Q. Does their indebtedness, in any way, stand in their way?—*A.* I have never heard of that, because I give them the improvements on payment by instalments, and they have always been able to pay their instalments.

Q. What is your complete outfit valued at?—*A.* At the present time the complete outfit never goes above Rs. 12 or 14. The fly-shuttle sley costs Rs. 6, the shuttle 1 and the dobbies vary in price, the cheapest being Rs. 3-8-0, which makes it Rs. 10-8-0 for the cheapest outfit. The more expensive dobbies bring it up a little more.

Q. They frequently introduce a few minor improvements on their own account?—*A.* Oh, yes; and some want more improvements than we are willing to give.

Q. Have they got any sort of association for marketing their goods. Do they make a piece of cloth and hawk it about for the rest of the week?—*A.* They take it into the bazar and sell it. I am not so well acquainted with the marketing of the stuff.

Q. The weaver spends a lot of time in the bazar?—*A.* Oh, yes; time is no object when it is a case of making a bargain.

Q. The bargain might be done by somebody else; if there was some co-operative system of buying and selling?—*A.* That is so, if it could be managed. It is a very difficult thing to get the different weavers to get a uniform idea of value.

Q. You have not come across any attempt at co-operation among weavers?—*A.* Not among the weavers. There are some co-operative members in Bhandara, but I have had nothing to do with the co-operative society. I have been working for them to take the improvements.

Q. Do you think that co-operative societies would be of any use unless they are helped by technical men, so that they might improve technical methods as well as their financial condition?—*A.* Small co-operative societies would be of great use when they come to take machinery, for instance, in cases where one machine would do for a collection of weavers, say a warping machine. One weaver cannot buy a warping machine as one machine could supply a dozen weavers or more. Then a co-operative society would be useful.

Q. Would Kamptee be a good place for you to start a co-operative society?—*A.* I should say it would.

Q. What are the weavers there, some Mahomedans and some Hindus?—*A.* Yes.

Q. Do they work together?—*A.* As far as I have seen they are quite friendly and would work well together.

Mr. Chatterton.—*Q.* Have you any weaving school under your charge?—*A.* I have a demonstration place under my charge, where I can bring in a weaver from an outlying district and give him instructions. It is not a large school in the sense schools generally are. My work is to go into the bazar and teach him there. If he is too far out, and wishes to see the working of the loom, I bring him in, give him instructions and allow him something for loss of time, say, 8 annas a day.

Q. How many looms have you?—*A.* Four.

Q. And how long do you keep these outstation weavers?—*A.* Two months. If they are not fit to leave, I keep them as long as they need training. If I got a smart man he would go out quicker.

Q. You simply teach him the use of the fly-shuttle loom?—*A.* Also the dobbie.

Q. Do they learn to work the dobbie in two or three months?—*A.* Yes, they all know the method of weaving fancy borders. The dobbie is only a mechanical method of doing what they are doing themselves.

Q. How many mistries have you got?—A. I have two teachers for weaving and one mistry carpenter for making the necessary alterations and repairs in sleys.

Q. You get these dobbies made locally?—A. Yes, I brought up one doobby from Madras and have had all the others made locally.

Q. Do you work with the School of Handicrafts?—A. I got some sleys made at the School of Handicrafts.

Q. Are you doing anything besides introducing flyshuttle looms, say, with warping mills?—A. I have one warping mill which I brought up from Madras. When any of the weavers come in, I demonstrate the use of that warping mill.

Q. In regard to woollen goods, are you doing anything yet?—A. I have made samples of woollen goods from the local wool. The local wool is not fine enough or long enough in staple to make warp yarn. I have bought warp yarn from the Cawnpore Mills and have had local wool handspun into weft yarn by the villagers.

Q. Do these local wool spinners work with a very primitive type of spinning wheel?—A. Yes, but still the principle is the same. They have running spindles. It does not matter what type of wheel is used as long as it gives the spindle a high speed.

Q. Do you think there is room here for establishing power supply for wool; is there sufficient power available?—A. There is a good deal of wool exported, and I believe a small plant could be used for carding and spinning.

Q. Do you know anything of the Welsh factories; those small woollen mills in Wales which are employed in making flannels for the miners?—A. I have been employed in Scotland, and also in the north of Ireland, and was managing a small factory which was making these goods. The fishermen used them for underwear.

Q. They have small woollen spinning mills there?—A. Yes, some make their own yarn.

Q. Would it be practicable to introduce something of that sort among the wool spinners or the weavers here?—A. Yes.

Q. Have you made any suggestions to the Department of Industries towards that end?—A. I have.

Q. Have you got any idea as to what it would cost for a demonstration plant of that type?—A. I could not give that off-hand. That is an engineer's problem.

Q. Have you had any estimate prepared?—A. No. I can easily get the information from home, because I have a plant in view that I have seen worked by water power. There is no water power here, but a small oil engine could drive the whole thing. They have a small teaser, a carding machine, a ring spinner and a scouring machine. The owner had a lot of hand weavers. He had a ring spinner to make his warp, and he also carded the wool ready for hand-spinning, and handed it out in the district to be hand-spun.

Q. Have you tried dyeing the wool?—A. Not here; at home.

Q. Would you dye the wool here for making homespun before you spun it?—A. I am not inclined to do that. You have a very strong sun and the colour would fade. It can be done easily enough. It would be far better, however, if you use the natural brown wool. You could have a variety of designs.

Q. Do you think the weaving of wool in this part of the country is suffering from the fact that there is no machinery for spinning. Do you know how many women are employed to keep a loom going?—A. It will take a good many women to keep one loom going, because spinning is a very much slower process than weaving. A fast weaver in a handloom at home would do 20 yards per day. Twenty yards per day means 10 lbs. of weft, and unless you have a little plant ready for carding, it would take a long time. It takes a woman a long time to do 10 lbs. of handspun yarn. She would take 4 or 5 days.

Q. In reply to the President you said that time was no object to a weaver when he was making a bargain, but time is no object to a weaver even when he is on his loom?—A. He has not the same idea of keeping time when driving a bargain as he has at home when weaving. Every man values his time when it is a case of working.

Q. Do these weavers take full advantage of the improvements?—A. Yes.

Q. Are they making better wages here in the case of the 50 sleys you have introduced?—A. Yes.

Q. If you devoted attention to organised sales of their products, it would benefit them considerably?—*A.* I am a textile expert, and mine is a different sphere.

Q. If a person was deputed to organise a sale department, do you think you could introduce a much larger number of flyshuttles?—*A.* If there was a ready sale for the material.

Q. So that you think your work as a textile expert ought to be supplemented by another man organising a sale department of this weaving branch, either through co-operative credit societies or by the establishment of central agencies for the sale of their goods?—*A.* Through co-operative societies, not through agencies. My experience of agencies is that the same man is agent for several concerns and if your stuff is difficult to sell and he has something cheaper, for which he gets a ready sale, your stuff is neglected.

Hon'ble Sir R. N. Mookerjee.—Q. No one appoints agents who sell similar goods from different companies?—*A.* No, but if he has a different class of goods, and is getting an easy sale for it, he is not going to waste his time to try and sell yours.

Mr. A. Chatterton.—Q. Supposing you establish as an experiment a Government depôt for selling the products of an improved loom, and put it in charge of some officer under the Director of Industries?—*A.* That is bolstering the thing up. You try to give them the improvements and put a trade in their hands. Except for introducing co-operation, I would not start to make a lot of agencies. I would rather give them a variety of stuff to make.

Q. Before you start co-operative credit societies to do this work, would it not be desirable to ascertain whether it is possible to establish co-operative societies for the sale of these hand-loom goods?—*A.* Not for the class of goods we are working at present. If it was a class of goods universally used, yes; but when you have localised products, I don't see that it would do much good.

Dr. E. Hopkinson.—Q. What method of selling do you recommend?—*A.* Personally I think the co-operative idea is quite good if you had a lot of weavers in small bustees. If you made half a dozen villages into a type of co-operative society, that would be a good idea.

Q. Would this society sell in the bazar?—*A.* The stuff is all sold in the bazar. The people who buy these things go to the bazar to buy them. I know, for instance, there is a bazar in Kamptee every week. All the cloth there is held by the bories. The village men sell to the bories, but that is the place where the public come.

Q. You think that is the best means of selling it?—*A.* That is the only way that I see in order to reach the people in the district, who want the goods.

Q. How is the weft yarn and the warp bought?—*A.* It is bought from these agents in the bazar. There are men in the different bazars who sell the yarn, and each individual weaver buys. In the co-operative movement they have depôts to sell yarn to members on more favourable terms.

Q. Do they usually pay cash?—*A.* I don't know.

Mr. C. E. Low.—Q. I understand that the Government Commercial Agent assists you in the matter of the sales?—*A.* We found that it was very expensive to have a commercial agent who was not an expert in weaving, so latterly I have not had the commercial agent going round.

Q. Then the sales department of the business must have been left to take care of itself?—*A.* The sale comes from demonstration in different villages.

Q. I mean the sale of cloth?—*A.* I don't know anything about the sale of cloth; that does not come in my sphere.

Q. The man is not working in touch with you?—*A.* Not in regard to selling cloth.

Q. Not selling cloth but arranging a market for weavers?—*A.* He may be, but I have not been in touch with the man in regard to that.

Q. That is rather an extraordinary state of things. If you get a man a loom which will make more cloth, he naturally wants more finance to enable him to buy more yarn and hold more cloth?—*A.* As far as I am concerned, if I get them to adopt my improvements and if they are benefiting by them, I am finished. It is technical instruction that I am trying to give.

WITNESS NO. 145.

Mr. E. Cove, Head-master, Government School of Handicrafts, Nagpur.

Written Evidence.

Q. 45.—Long before technical schools were started in England, workmanship standards were good. A boy could, and did, learn his trade thoroughly, by the apprenticeship system. That was because, even then, England was a comparatively advanced country. Technical schools in England were only started to supplement a boy's training, chiefly in the matter of drawing. It is different in this country. Unless a boy attends a technical school or serves an apprenticeship in a railway or other big workshop where Europeans are employed, how is he to become a really skilled artisan? Certainly he cannot learn much in bazar workshops. Technical schools are, therefore, in my opinion, peculiarly necessary in this country. Training of labour and supervision.

Q. 48.—For a school to be a success it is necessary to recruit teachers from the ranks of those who have made the business a success to the extent of getting a good living by it. This is the method followed by the controllers of probably the largest number of industrial schools in the world, namely, the Education Department of the London County Council. They have found that while it is desirable to have teachers who have been trained in the art of teaching craftsmanship, it is necessary to import into the schools ordinary craftsmen from commercial firms, not only to show the latest workshop methods but to give the pupils some idea of working against time. I would bring out European craftsmen as teachers on a five years' agreement. If they renewed the engagement they could be given posts as head-masters of branch schools; if they preferred not to renew, the schools would not suffer by it as fresh men with newer ideas could be drafted into their place. During their five years as teachers, these men would be qualifying for head-masterships and their most skilful and able pupils would become instructors.

To reduce expenditure on scholarships, I would, if I had responsible teachers as suggested above, make the boys work on commercial jobs as apprentices do at home where they are made to be a source of profit. A boy cannot learn a trade without making something, and there is no reason why it should not be of a useful size. It gives a boy more interest in the work of his hands if he knows it is not going to be scrapped as soon as it is made. No idea of working against time can be gained by making miniature articles.

To keep the school workshops busy with plenty of work, Government should stipulate to Executive Engineers that technical schools should be given the option of undertaking the joinery and ironwork of Government buildings. This would be a distinct advantage to Government as well as to the schools, because at present the appearance of some Government buildings is completely marred by the woodwork, which by reason of bad workmanship is quite unsightly. This could not be regarded as competing with private enterprise because profits would go to the pupils in lieu of scholarships. But it would be an effective way of training boys, and the item of scholarships (by no means a small one) would be saved.

Brief history of the School of Handicrafts and Mochi School.

The School of Handicrafts was opened in April 1913 with a capacity for 36 pupils in the workshops, drawing class-room and hostel. The course was for three years. Trades—Smithing, fitting and turning, carpentry, wheel and cartbuilding, painting and polishing. Included in the curriculum were drawing, measuring, calculating: the English names of tools and materials, manufacturing processes of materials and all about oil-engines. Only boys of artisan castes are admitted.

One batch of 14 pupils have as yet finished their course. Two of these have taken charge of a branch school that we have started in Saugor and they are teaching carpentry and drawing: three are working in a similar capacity in our school: one became a teacher in a Mission school on Rs. 25-0-0; two are working in the Gun Carriage Factory, Jubbulpore: one in the railway signal department; two in a cabinet making firm, and the rest, I believe, are working in their villages where the tools that we supply them on leaving, are a source of admiration and education to the villagers. A good proportion of these tools were made in the school.

At the beginning of this year, on the recommendation of Mr. Sly, who expressed himself as very satisfied with the school, the Chief Commissioner passed orders for the capacity of the school to be doubled. At this time I submitted a proposal to admit older boys and to shorten the course to two years, as I felt that we were wasting time and money by training small boys of 13 and 14 years of age who were really too small to hold the tools. This proposal was accepted, and now only boys of 16 years and upwards are admitted, the value of the scholarships being increased by one rupee. Being a two years'

course we require 36 fresh pupils each year. We have now, or will have when the boys return from vacation, given on account of plague, ten third year boys and thirty-six first year boys, made up of twenty-six new and ten 2nd year boys, or 46 in all, which will be increased to 72 next term.

In this school a lot of improved agricultural and industrial tools and implements have been made to my design, from a potter's wheel up to a large eight-tined automatic and adjustable seed-drill which is being used by the Agricultural College and is reported on as satisfactory.

Synopsis of development.

This school is in process of doubling, the extensions being well in hand.

A branch school for 24 boys has been started in Saugor.

Schemes for branch schools at Amraoti and Jubbulpore are under consideration by the Local Administration. It is probable that the Amraoti branch will start from 1st of next April.

Mochi School.

This was started in a hired building in April 1912. It has been housed in the main building since February 1914. Mostly adult pupils are admitted. The course is between one and two years according to the aptitude of the pupil. No scholarships are given, but after deducting the cost of materials from articles sold the balance is handed over to the makers. At first they earn very little, but as they progress they earn anything up to Rs. 25 per mensem. Nineteen mochis have been fully trained and have received the school's certificate. About the same number have come in for short periods, ranging from one to three months. Tools are purchased for each passed pupil out of deferred pay, and with these tools and a small cash balance they start in business. They get together by threes and fours and open a shop. One of these small associations of passed pupils is employing fifteen or more outsiders whom they are teaching. I have obtained for them large contract orders, which I have distributed according to the outturn capacity of each association. I am responsible for the quality of the work and the regular outturn.

Lasts being difficult to obtain we make them in the carpenter's shop and sell them to the passed pupils. Labour-saving devices are also made. In short, anything to help these men and foster their enterprise, that can be done by the school, is done.

Brass hollow-ware making from sheet.

The question of helping this industry has been thoroughly gone into and the details have been worked out. This is briefly the situation. Brass hollow-ware making is at present a cottage industry, the tools required being a pair of shears, a hammer, an iron block and a soldering-iron. Try to increase the worker's outturn and it can no longer remain a cottage industry for the simple reason that the only alternative to hammering the sheet into shape is to press it, and presses cost £ 500 and more. Cannot the matter be compromised by inexpensive hand-power presses? No! Whether you press by hand or by power, you have got to provide an apparatus capable of exerting, for a Goond (water vessel), a pressure of approximately a hundred tons. Such a press with toggle-drawing dies would cost Rs. 1,000 and would give about six operations, that is, six Degchies an hour. A power-press, on the other hand, would cost Rs. 8,000, and would give from 600 to 900 Degchies an hour with the same number of labourers.

The only inexpensive plant we can introduce is a lathe driven by a small oil-engine. Sheet workers can spin Thalis into shape on this. A wooden die is chucked on the headstock and a brass disc is held up to it by a ball-bearing centre in the tailstock; then by means of a wheel-tool held in the slide-rest, the disc is spun into Thali shape. Afterwards, the Thali is given a fine polish, which is a comparatively easy matter when your lathe is being driven by an oil-engine.

We have such a spinning and polishing plant touring the province now, demonstrating at brass and bell-metal working centres. Bell-metal workers would find such a plant particularly useful, as their castings being very hard, make it a slow and laborious work to produce a fine finish and polish, using the primitive Karat revolved by a man pulling a strap. To spin a Thali on this lathe is the work of about three minutes; by hand the same job takes an hour. This small plant will suggest to moneyed men the possibilities of power-presses and spinning-lathes, and it may encourage them to invest in a small factory like the factories of Bombay and Poona. The engineer in charge of this plant is well equipped with all the information necessary, having worked in such a factory. A small disc-cutting machine accompanies the plant.

I suggest that the following demonstration factories could be started:

There is no doubt whatever that unless the brass sheet hollow-ware makers of this province adopt power-presses and spinning-lathes, that is, unless they start factories, the ousting of their trade by aluminium ware is only a matter of time. Already, this ware is found in large quantities in all the bazars of the Central Provinces. I consider that this fact makes out a good case for starting a demonstration factory. I have talked to moneyed men in the brass trade on the subject and have suggested that they start a factory, but being so ignorant, having never been out of the province in their lives, their attitude of mind with regard to power-presses is the same as our attitude was a generation ago with regard to flying. If they saw pressing and spinning demonstrated, I think there is little doubt that they would readily pay the full price for a factory in good working order, so that Government would have no difficulty in disposing of the factory. My opinion is that Indians are ready enough to invest their money in ready-made concerns, but that having no experience and little enterprise, they wish to be saved all the trouble of working out the scheme.

Another demonstration factory that could be started by Government is a sawing and planing mill to which I would add a wheel-making department. It is cheaper to buy ceiling matchboarding that has come all the way from Europe than to buy locally made matchboarding. Hand labour cannot compete against machines. In Nagpur there is no saw mill; every thing has to be cut up and planed by hand. Again, wheels can be better and cheaper made by machinery than by hand. The machine gives precision, by comparison to which the craftsman's work is erratic and unreliable. The following machines would be required:—Spoke lathe; Spoke tenoning machines; Hub boring and mortising machine; Tanging machine; Felloe planer; Rim, dressing machine; Boring and boxing machine. As an alternative to a wheel-making factory I would suggest a peripatetic show consisting of a few hand-power machines for mortising and boring, tanging, tyre-bending and tyre-shrinking.

Lastly, there is a real need for a chrome tanning factory. Chrome leather has caught the popular fancy and nearly every wearer of modern shoes insists on getting chrome. We use nothing else in the school, and our passed pupils are asked for nothing else. A tanner in Kamptee told me that he would willingly employ a man, European if necessary, to teach him chrome tanning and to organize his factory. Government should employ an expert either to go round teaching at the tanneries or to start a demonstration factory. Perhaps, the latter would be the more successful way of introducing chrome tanning because the factory would be open to all to come and learn and to copy from, whereas in the former some factories would have to wait a long time for a visit from the expert.

Oral Evidence, 16th December 1916.

President.—*Q.* If these factories, which you recommend, became successful the ordinary worker would be knocked out except such as those who come into the factories, and the rest would have to find their living elsewhere. Do you think that there is any real prospect of introducing improved methods in this way and thereby displacing large numbers of hand workers?—*A.* I think the factories are bound to come in for this work—aluminium as well as brassware.

Q. You want the same thing to be done in the case of brassware and copper?—*A.* They prefer brass to aluminium.

Q. The result will be the displacement of some thousands of workers in this part of the country,?—*A.* Yes. There are about 22,000 workers in the Central Provinces.

Q. You could not employ 22,000 workers in the factories?—*A.* We can employ at the outside, say, 1,000 workers.

Q. Will this make you a cheaper article and thereby increase the total sale of copper and brass goods?—*A.* Yes.

Q. And the country will have to import more copper and more brass?—*A.* Yes.

Q. The country will not be wealthier for that? In the same way if you had a central factory for the making of wheels, say, at Nagpur and a sales agency organised on business lines at Kamptee, the village wheel wrights would have to go somewhere to get a job?—*A.* Certainly it would knock out a lot of hand labour. But I propose an alternative—a peripatetic show consisting of a few hand-power machines.

Q. If they are not more efficient they will never be accepted. If they are more efficient they will knock out a certain number of workers?—*A.* The wheels will become cheaper.

Q. Actually cheaper than the present wheel?—*A.* They charge Rs. 25 per pair for small kachha things.

Q. You say, "To keep the school workshops busy with plenty of work, Government should stipulate to Executive Engineers that technical schools should be given the option of undertaking the joinery and ironwork of Government buildings"?—*A.* We would only accept sufficient work for our class purposes, for the purposes of the course of training.

We would not keep the whole course on one kind of work. If a boy wants to become a joiner he has to learn to make doors, frames and windows. That is what we want to teach him. By doing this work he learns to work against time.

Hon'ble Sir R. N. Mookerjee.—Q. Suppose there is a building to be constructed and the Executive Engineer asks you to supply all the doors and window frames and the building is to be completed in twenty months, will you be able to make all the things necessary?—*A.* I suggest an option. We can do as much as we can. We are not always building such a large building as this. The idea is to teach a boy to work against time and also to save scholarships.

President.—Q. In Bombay I understand that they have a scheme by which they give marks for the total quantity of work done from the time the students enter the school to the time they leave it after a four years' course. They do not manufacture doors and windows but they have select articles which they make, and they get marks for the quality and quantity of work. Consequently a boy knows that if he loses five minutes he will never be able to make them up in the rest of the four years. It introduces a good spirit?—*A.* What do they do with the work they make?

Q. I do not know?—*A.* If you are going to scrap the article as soon as it is made the boy will be discouraged. I do not think that you can teach a boy to work against time if he has to make miniature articles only to be afterwards scrapped.

Q. My experience is that if you devote the school supplying orders in competition with ordinary private enterprise you think more of producing the articles than of training the students?—*A.* We always put so many boys on one kind of work at the same time, and thus a spirit of competition enters into the work.

Mr. A. Chatterton.—Q. You have been in this school for 3½ years?—*A.* Yes.

Q. Previous to that you had experience elsewhere in India?—*A.* Yes. I was in a Mission school for 12 months.

Q. You say in your note that it is desirable to get plenty of work for the school?—*A.* That they might be taught to work against time.

Q. And also become expert in particular occupations?—*A.* Yes.

Q. You say that in India technical schools are peculiarly necessary?—*A.* Yes. By that, I mean trade schools.

Q. Your school is confined to sons of artisans?—*A.* Yes.

Q. I should like to know from your experience whether there is a real demand for improved artisans in the villages from which you are drawing these students?—*A.* I do not think there is any demand in the villages yet, but it will come, if improved agricultural implements become more popular.

Q. What does the village carpenter do in the village?—*A.* He makes ploughs and wheels.

Q. Does he make any furniture at all?—*A.* They do not have any furniture in the villages.

Q. Do you expect your boys will go back to the villages, or do you think they will be able to find employment in towns?—*A.* A portion of them will have to go back to the villages if they do not find work in the towns. I suppose 75 per cent. will find work in the towns, and the rest will have to go back to the villages to benefit the craft, to educate their fellow craftsmen.

Q. In each village is there more than one carpenter?—*A.* It depends upon the size of the village. Some of our boys come from villages that contain only one family of carpenters, I think.

Q. Take an ordinary village implement—the country plough—do you think that you can make it with improved tools and better methods of construction?—*A.* Of wood? No.

Q. You do not teach your boys how to make the implements which they will have to make when they go back to the villages?—*A.* We give them a general training in order that they may be able to tackle anything of the kind. My opinion is that the next stage of improvement to the wooden plough is the iron plough. These ploughs are tipped with iron.

Q. Do your blacksmiths make these iron-tipped ploughs?—*A.* It is a simple thing. We teach them something superior.

Q. You say, "There is no doubt whatever that unless the brass sheet hollow-ware makers of this province adopt power-presses and spinning-lathes, that is, unless they start factories, the ousting of their trade by aluminium ware is only a matter of time"?—*A.* I do not say that it is desirable.

Q. Would it not be advisable to introduce aluminium?—*A.* Yes. But I think that brass will be more popular for years to come. They prefer brass.

Q. Do they take to aluminium?—*A.* Yes. It is cheaper, weight for weight. But they do not like it and prefer brass.

Q. If there is a possibility of the manufacture of aluminium in India itself, would it not be an advantage to encourage aluminium so as to create a market for it and help to bring about the establishment of a large factory?—*A.* Yes, because aluminium has many advantages over brass.

Dr. E. Hopkinson.—Q. Under what department of Government does your school come?—*A.* Under the Department of Industries.

Q. You make your reports to the Director?—*A.* Yes.

Mr. C. E. Low.—Q. You say, "During their five years as teachers, these men would be qualifying for head-masterships and their most skilful and able pupils would become instructors." What type of instructors? What degree of responsibility do you suppose they would eventually be able to rise to?—*A.* To run the practical part entirely, under supervision.

Q. They may become capable of being put in charge of schools of handicrafts?—*A.* No. I do not think so.

Q. Supposing you had the system of teaching manual work in primary schools, do you think such men would be suitable for the purpose?—*A.* I think so. We have instances of that. Some of our pupils are already teaching in schools and are doing very well.

Q. You say that you give tools to these boys. Can you give one or two instances where the tools will give the boy an advantage over the ordinary village tool?—*A.* They cannot make anything smooth with their own plane. Their saws are never straight, they are always a little hollow, and consequently cannot cut anything like so quickly. I saw two men tugging at a little saw like this, and I substituted one of our English saws and the man was able to do more work by himself than by having another man pulling at the other end. As regards shoe makers, there are no improved tools. They have to use the same tools.

Q. Has any of the mochi associations invested in sewing machines?—*A.* Two of them have.

Q. Have you yet recruited any bigger boys for your two years' course of carpentry and blacksmithing?—*A.* I have twenty-six of these older boys.

Q. How do you find them pick up work?—*A.* The big boys get hold of it much more quickly.

Q. Had they been doing any artisan work in their own houses before they came in here?—*A.* No. They might have helped their fathers, but some of them had never even seen a file.

Q. Do you find that they have forgotten what they learnt in the primary classes?—*A.* No.

Q. Because ordinarily one finds in the villages that the boy who has been through these primary schools has often forgotten in a few years even to write his name?—*A.* I have not noticed it. We find that they can write.

Q. In this brass spinning, can you spin anything but thalis?—*A.* Only Degchie lids. Goonds require three operations of pressing and three operations of spinning.

Q. You told me yesterday that your passed mochi pupils need financial assistance. How do you think that could be arranged?—*A.* I think the Director of Agriculture and Industries might be given some money for the purpose of helping the mochi boys who form partnerships, but I would not give it to men who, I think, would run away.

Q. That is, the financing agency should have some form of supervision with regard to their honesty and efficiency and so on, and obviously Government cannot do it to an unlimited extent?—*A.* Not on a large scale.

Q. Have you thought out whether any financial organisation could be started to meet that difficulty?—*A.* No.

Q. Could you think of any other industries which would need the same kind of financial help?—*A.* I have not thought of any industry like that. It would not touch the brass workers.

Q. Not as they exist, but if you give them these spinning-lathes?—*A.* The plant that we have demonstrated will cost Rs. 1,500.

Q. Some of your mochi associations are taking as much as that?—*A.* Yes.

Q. Would they not want a small advance?—*A.* When they see the success of the plant they will take it up.

Q. It is more likely to be taken up by the banias at present?—*A.* Yes.

Q. Do you know whether there is already in India a matchboard making factory or wheel-making factory?—A. I do not know of any in India. Here is a case of the need of sawing mills. (Witness reads the rates from a book.)

Q. As regards matchboarding are there any Indian woods in this province which you have come across, which will be suitable?—A. Only teak.

Q. Deodar would be suitable, I suppose?—A. Yes.

Q. Have you seen anything of the work done in concerns in Assam which make tea boxes?—A. I have not seen it. I had a case to-day. The ordinary dealwood matchboarding which comes from England costs Rs. 19-8-0 for 100 sq. feet. I asked what it would cost to make it at Nagpur, and I was told Rs. 30.

WITNESS NO. 146.

Sir Bezonji Dadabhoy Mehta, Kt., Manager, Central India Spinning, Weaving & Manufacturing Coy., Ltd., Empress Mills, Nagpur.

Written Evidence

With no desire to appear as a witness, I beg to submit for the consideration of the Industrial Commission, for what they may be worth, the following suggestions without any claim to their being original or novel.

Mercantile marine
and ship-building.

It is essential for the progress and development of Indian industries and commerce that India should possess its own mercantile marine for the transport of at least some portion of its imports and exports by sea. It would enable India to meet in a measure any unfair international competition in commerce. This has been well demonstrated by the Japanese having their own steamship lines. They have not only been able to stamp out the imports of Indian yarn into their own country, but have been most successful in competing with it in the China market; so much so that the latter, once a lucrative monopoly of the Indian mills, is gradually but inexorably slipping off their hands. Already the Indian and Japanese exports of yarn to China about balance each other; and the former are steadily declining. The recent failure of the group of the Greaves Cotton Spinning Mills in Bombay may be said to be largely due to this cause. Having their own shipping, the Japanese importers and exporters can co-operate and combine to import cotton and export manufactures at favourable freight rates. They are even now actually importing into India itself their manufactures and competing not only with the home products, but also with those of Lancashire. I do not say that their mercantile marine is the sole cause of this success; but there is no doubt that it is one of the principal contributory factors. That great far-seeing practical industrialist, the late Mr. Jamsetji Tata, having had some knowledge of a few Bombay merchants having owned ships in olden times and acquired wealth, appreciated so greatly the importance of a nation possessing ships of its own that he endeavoured years ago to interest Bombay capitalists in a scheme for purchasing or building even three or four ships for the China trade which he considered as being much handicapped by foreign companies imposing exorbitant freight rates. When he did not succeed in his laudable object, he turned his attention to another direction. He persuaded a Japanese shipping company to compete with the powerful P. & O. line, undertaking to reimburse such losses as the former might sustain by the latter reducing its own rates just to drive out a rival from the field. Before making himself responsible for such losses, Mr. Tata had obtained assurances from the leading shippers to patronise the new Japanese lines exclusively at a fixed rate. The opulent and powerful P. & O. Co., finding the business to China slipping out of its hands, adopted the bold expedient of reducing its own freights to a nominal figure. The bait, though a short-lived one, of exports to China at almost no cost, was too strong for the shippers to rigidly adhere to their compact. They gradually managed to wriggle out first by shipping their goods in other names and then openly breaking away. Mr. Tata, not very wealthy at the time, was thus forced to admit defeat, having lost Rs. 2 to 3 lakhs himself, and the scheme fell through. I mention this incident especially to show the importance he attached to an indigenous mercantile marine for the protection and development of the overseas trade of India. And its necessity is being more and more accentuated by the growing importance of India in the international markets all over the world, and especially in times like the present. The profits of foreign carrying companies from their Indian business constitute no small economic drain from India. Government would therefore, in my humble opinion, be quite justified in giving what aid it can legitimately do in starting an industry fraught with such immense potentialities for the benefit of the people and the State itself during critical times. This aid might take the form of a guarantee of interest on the capital invested as in the case of the Indian railways when first inaugurated, or subsidies on some such terms as are now being offered by the Japanese Government to joint stock companies formed for the purpose of manufacturing dye-stuffs in Japan.

Again, from the point of view of the country's industrial welfare it is desirable that ships should be built in India. The Government Dockyard at Bombay was once famous for the ships it turned out for merchant princes as well as the Imperial Navy, but those ships were exceedingly simple, compared with the leviathans of the present day, which are the products of the best expert scientific and technical knowledge, skill and calculations. To permit of their construction in India, it would be necessary to import a number of designers and supervisors from England or other countries for some years. The benefit that would be conferred on our artisan classes as well as those aspiring to higher industrial professions would be very great. Accuracy and skill in the use of tools, and the habit of observation as to the smallest details, which are now so wanting in some of our best artisans, would be rigidly enforced and acquired.

It might be objected that the time for an Indian ship-building industry is not yet, but if we wait for a generation, we shall find ourselves then just in the same position as now. It would be a costly commencement certainly, but one fraught with potentialities. If Japan could build both mercantile and warships assisted by imported experts and material at first and be so successful now as to dispense with foreign aid, could not India with its British rule and British connection do the same? Of course the beginnings must be slow, and perhaps an Indian company on its first formation may have to buy foreign-built ships with Government guarantee as to interest, to meet any unfair competition; but in time it must begin building ships if it is really to be prosperous and successful. We have now an iron and steel industry which already is prepared to expand greatly and which even now supplies pig-iron to Japan, and we may confidently hope that most of the material for ship-building could be produced in this country in time.

If Government naval yards could also be established in Indian harbours, there would be much wider opportunities offered to the Indian people of acquiring industrial skill, knowledge and experience, which technical schools or technological institutes, though beneficial in their own way, can scarcely afford. The building of battle-ships in India would be no little gain to the Empire itself. As a well-equipped independent unit of the Empire in crises like the present, which let us hope may never recur, or even in less critical times, India would be of invaluable assistance to the mother-country. In minor matters, it would help to minimise labour troubles in other parts of the Empire. These essential adjuncts to industry may be expected to give no small impetus to India's economic progress and prosperity. I believe, the foundations of Japan's wonderful political and material development were laid when the Japanese took to making their own locomotives and building their own merchant and warships.

In the matter of railway communications, Government is doing what it can so long as its finances will permit in laying down new lines. But one wonders what it could mean when small gaps are left in a large through system which would otherwise lead to direct communication with important parts of India and increase the development of industry and commerce. For instance, the Central Provinces and Berar cannot communicate direct either with the south or the north without making long detours from certain important centres of trade. The south could have been easily reached years ago by a direct route, saving an unnecessary haulage of some 500 miles, if the small gap of about 200 miles between Ballarshah and Warangal could have been bridged. The necessity of this link has been seen and discussed for years, but why no steps have been taken so long is a mystery. The difficulties in the way could not be insurmountable. I enclose copy of a representation made to the Local Government, and I understand the Hon'ble Sir Benjamin Robertson has taken up this important question with the authorities concerned. We may therefore hope that it may not again be shelved, as it has hitherto been done. Then the Nagpur-Itarsi line, which gives the Central Provinces and Berar a shorter and direct route to Northern India, has after years been in an advanced stage of construction, leaving a gap of some 60 miles for want of finance, and thus the object of a very short and direct route is for the time being at least frustrated. Such obstacles must retard the growth and development of traffic.

Railway facilities.

Besides these two gaps, there are to be noticed some very insignificant, and for that reason all the more irritating, gaps left with what reasonable object it is difficult to understand; but they offer real obstructions to potential traffic. There are two instances in our neighbourhood, *viz.*, at Chhindwara and Chanda, where the termini of the Great Indian Peninsula and the Bengal-Nagpur Railways are only separated by about a mile each. If company-managed railways are to remain and work side by side with the State-managed ones—and it is desirable they should—then self-interest should be subordinated to the public good, and the Railway Board, as the chief controlling authority, must have power to brush aside any petty jealousies. I enclose copy of correspondence with the Bengal-Nagpur Railway on the subject of the short gap at Parassia.

The Bengal-Nagpur Railway narrow gauge line, which terminates three miles from Nagpur, if brought up to Nagpur, would also save much vexatious delay and inconvenience to local traffic, besides releasing a number of broad gauge wagons used for haulage between Itwari and Nagpur. Surely there can be no insuperable difficulties in the way, and when once overcome, the advantage both to the public and the railway by the saving of wagons and facilitating traffic will more than compensate the small cost of bringing up such lines to their natural destination.

The doubling of the Great Indian Peninsula line up to Nagpur, though, sanctioned years ago, is proceeding very slowly, and the Bhusawal-Nagpur section therefore suffers severely from congestion during every busy season. With the expansion of traffic in cotton, manganese and other commodities, the situation is growing more and more acute year by year and the railway is frequently compelled to summarily prohibit all bookings at intervals to clear deadlocks along the line or large accumulated stocks at stations. The hardships and financial losses thus caused to trade and industries, great as they were already, have been further accentuated since last year by the unprecedented situation created by the new factor of coal traffic to Bombay, the tonnage crisis caused by the War having suddenly thrown on the railways the burden of handling the whole of this traffic hitherto served by the sea. The resources of this congested section are thus being highly strained, and it seems to me imperative that the construction of the whole of this double line and other connected works, like the remodelling of the yards at Nagpur and other centres, be pushed forward to completion as vigorously and expeditiously as possible.

The system of sanctioning and even proceeding with open-line or new projects, but not allotting sufficient funds to carry them out continuously to the end, must cause a great and unnecessary waste of energies, materials and interest. It seems an unbusiness-like procedure to make such projects dependent on fortuitous factors like surpluses or other budget arrangements which might vary from year to year. A sound business corporation would in no circumstances consider it prudent to carry out its own projects in this piece-meal fashion. When once, after full consideration, any scheme for the improvement of an existing line or the construction of a new one is sanctioned, it ought not to be starved for funds; but carried through to the final stage at all costs. Surely the advantages expected from all such schemes, when in full working order, must more than counterbalance any temporary financial inconvenience.

The cotton industry.

The cotton industry, though making steady progress, is capable of great expansion. The most serious handicap is want of steady and skilled labour for finer work. Long stapled cotton can be imported, as is done in Europe and elsewhere; but any competition with the finer goods, which constitute the bulk of our imports, connotes concentration in work, skill and agility which are sadly lacking in the mass of the operatives as are found in Indian textile mills. There is a constant cry from every manufacturing centre of irregularity in attendance, and there must be few cotton mills which are not suffering from shortness of labour. The reason is not far to seek. Mill life, as it is understood in India, is one monotonous round of drab, dreary toil. Grinding work for 12 hours a day and 312 days in the year must turn away many an earnest worker. Wages alone, though high enough, cannot compensate for the rigours of such a life. Labour then takes the remedy in its own hands, attends when it suits its purpose and absents itself when it can. The dawdling habits of the operatives are also to be ascribed to the same cause. The true remedies for this state of affairs are shorter hours of work, more holidays, and provision of some rudimentary comforts for work-people. Welfare work in the direction of providing healthy and comfortable dwelling-houses, play-grounds, recreations, education for the children of the operatives, medical aid, hospitals, etc., is becoming an indispensable desideratum of factory life, leading not only to their contentment and happiness, but also to the prosperity of the industrial concerns themselves. But above all, elementary education of work people must be the foundation on which this welfare work could be based. Without it the best dwellings will be turned into hovels; sports might lead to squabbles and recreation rooms to drink-shops. In the eloquent words of the late Mr. Gokhale: "With the diffusion of universal education, the mass of our countrymen will have a better chance in life; with universal education there will be better success for all efforts, official or non-official, for the amelioration of the people, their social progress, their moral improvement, their economic well-being." Mass education alone will raise the general level of intelligence among the whole community; it will inculcate in them a more refined standard of living and broaden their outlook, thus bringing into play factors which must necessarily react on the industrial efficiency of the worker. This has been the experience of every civilised country in the world. Elementary education was made universal in Japan only forty years ago, and I believe in this lies the secret of the amazing success she has since achieved in all her pursuits, whether of peace or war.

Though, as I have stated above, the long-staple cotton can be imported, it would accelerate the development of the Indian cotton industry a good deal, if it is successfully grown in large quantities in India. The best indigenous long-staple cotton was once the famous Hinganghats, the whitest, cleanest and strongest staple in the world; but unfortunately owing to its poor yield per acre it has all but died out. Many exotics have been tried by the Agricultural Departments all over India. Some of these have given great promise of success; but in almost every case the results have been disappointing, due in a large measure to the cultivators and dealers not understanding their ultimate interests, and with a view to present gains, mixing the long staple with the short, which is a comparatively abundant yielder. I think Government should devote their attention by every means in their power to *increase the yield* of the indigenous long staple or Bani, as the exotics seem to deteriorate on account of adulterations, combined no doubt with climatic influences. The average yield of lint per acre in India is not even half that in America, and that of long staple considerably less. Per-

sistent attempts in the direction of intensive cultivation, especially in connection with the long-staple variety, are necessary towards discovering such chemicals or other artificial fertilisers as are best suited to the Indian soil and climatic conditions. A few American expert agriculturists may also be employed as an experimental measure towards this end. In several districts, the rainy season being of short duration, the cotton plants do not get sufficient moisture for the crops to be matured, and irrigation in such cases would help greatly the increase of yield, especially of long-staple cotton.

The local Agricultural Department is doing much useful work in this direction; but it is a fact that it has almost been obliged to give up experiments with the long staple and devotes itself more and more towards encouraging the shorter staple, which is such an abundant yielder. The department is quite justified so long as the cultivator obtains a comparatively more remunerative return for the shorter staple on his farm, but I do not think we should despair and give up further trials with fertilisers of different kinds and with irrigation, where possible, towards improving the yield of the long staple. Even if there is failure in one province, there are no doubt other parts of India more suitable for growing long-staple cotton, and the yield there might be capable of great expansion under the right kind of fertilisers or irrigation or both.

It may be mentioned in passing that if the Agricultural Departments in all parts of India, as in these provinces, looking to the immediate interests of the cultivators, encouraged the growth of the short staple, as it certainly would prove a more abundant yielder under similar circumstances, than the long staple, a time must come when the price of the short staple will fall in relation to the longer one and the former possibly become a drug in the market. It may then take years to revert to the long staple.

If even some approach to the American yield is practicable in India, the problem of the long staple indigenous cotton would be solved, the crop would be enormously increased and thus a powerful stimulus would be imparted to the development of the Indian cotton industry, benefiting growers, spinners and exporters alike. The demand on cotton crops throughout the world is continuously outgrowing the supply, and American cotton prices, even during the present War crisis, have soared to heights which were only reached during the Civil War. It is even feared that in a short time America may utilize the whole of its crop for its own manufactures, and Lancashire will have to look for its raw material elsewhere. It is therefore imperative for the Government of India, and even the Imperial Government, to leave no stone unturned in exploiting the possibilities of the Indian crop.

Knitting and hosiery work would be a suitable cottage industry as an adjunct to hand-loom weaving. The Indian market in these goods is now practically a monopoly of Japan, where the industry is worked mainly as a cottage one. But the machines required are costly and beyond the means of the Indian cottage worker. It is, however, well known that sewing machines, though also beyond the means of the poor, are to be seen working even in villages all over India. This is due to the enterprise of the Singer Sewing Machine Company, whose agencies are studded all over the country and who, by their system of hiring out machines or selling them on the easy-payments system, have succeeded in establishing a vast and lucrative business. It is on the same lines that hosiery and knitting machines can be spread over the country. Government might subsidise one or more machinists to establish agencies for this purpose. If the Singer Sewing Machine Company, with its large number of established agencies, could be induced to undertake the business, it could work it much more cheaply than other machinists who would be new to the country and who would have to incur a large expenditure in establishing and running their agencies. Cottage industries.

If forests could be made far more accessible than they are, the timber trade could be greatly developed. India, with its variety of climates, is believed to be capable of growing every variety of trees, and yet wood and wood-work is imported from foreign countries, because the cost of transport, etc., of the indigenous article is too high! Government might aid the development of the timber industry by providing wire ropeways, tramways and light railways, and even up-to-date saw mills, in all parts of the forests, so that accessibility to them may be made more easy and cost of transport greatly reduced. Government might even cut down, stock, and season wood ready for use. It might be costly at first, but in the end it would pay. Capitalists could in time see their way to start saw mills and work the timber traffic themselves, provided that every forest is made accessible in every available part, and the railway or transport charges made reasonably low so as to withstand foreign competition. Forests and wood-working industries.

The textile industry requires large quantities of wood bobbins, tubes, shuttles, sleys, rollers, bowls, etc., for which India could supply suitable timber. We hitherto received these from England, but Japan has also for some time past been successful in exploiting the Indian markets in these lines. There is no reason why this industry should not be started in India; but with its control of forests and its large resources in regard to expert knowledge, etc., the pioneering work must largely rest with Government in the initial stages at all events.

All industrial and commercial activities in India are being seriously handicapped by the periodical stringency in the money market every busy season. Mr. Chamberlain's Commission on Indian Finance and Currency have given it as their opinion that this stringency is in a large measure created by the revenue operations of the Government Discount rates.

itself and have strongly favoured State action for its relief by means of temporary loans to presidency banks from the treasury balances or the paper currency reserve. The subject has been fully dealt with in paragraphs 136 to 165 of the Commissioners' Report. I think Government should proceed to give effect to their recommendations under this head year by year as soon as the presidency bank rate for demand loans goes over 6 per cent.

Correspondence No. 1.

The Ballarshah-Warangal Railway Project.

No. 294, dated the 5th August 1914.

From—KHAN BAHADUR SIR BEZONJI DADABHOY MEHTA, Kt., Manager, Empress Mills, Nagpur,

To—C. E. Low, Esq., C.I.E., I.C.S., Director of Agriculture and Industries, Central Provinces and Berar, Nagpur.

I have the honour to address you the following representation, on a matter which vitally affects the trade, industries and social amenities of the Central Provinces and Berar, and shall thank you to bestow favourable consideration thereon, and take such steps as are best calculated to secure the object in view.

2. As you are aware, our Provinces are deprived of a very large proportion of the natural advantages due to their geographical situation, owing to the want of adequate railway facilities. The two trunk lines serve us well, so far as communication with Bengal and Bombay is concerned; but up to only a few years back, we could not boast of even a single direct north-to-south line, the sole means of communication with Upper and Southern India being the very long and circuitous routes *via* Bhusawal and Manmad respectively. Matters have, however, considerably improved of late, so far as connection with the North is concerned. There is already a narrow gauge line between Jubbulpore on the one trunk line and Gondia on the other, extending up to Chanda; and it is satisfactory to note that the Great Indian Peninsula Railway are pushing on vigorously with the construction work of the Nagpur-Itarsi broad gauge line. The first section from Itarsi to Betul is open already, and the whole is expected to be ready in two or three years. This line has certainly come not a day too soon, and places within the reach of the trade and the travelling public of these Provinces a very short and direct means of communication with Northern and Central India, the United Provinces, the Punjab, and above all, the new capital of India.

3. It is, however, much to be regretted that the most important project of a direct connection with the South, in continuation of the Nagpur-Itarsi line, has been allowed to drift for so long. It cannot be denied that, if the Central Provinces and Berar are to have their proper share of trade with His Highness the Nizam's Dominions, as well as the Madras Presidency, which they adjoin, a central and direct north-to-south communication is an imperative necessity.

4. If one looks at any railway map of India, one is at once struck with the vast expanse of railless territory below the Bombay-Nagpur-Calcutta trunk line, right from Manmad at one end to Kharagpur at the other. The large rough triangle formed in the middle of India, by the railway lines connecting Manmad on the Great Indian Peninsula, Bezwada on the Madras and Southern Mahratta, and Kharagpur on the Bengal-Nagpur Railway with each other, has absolutely no means of through communication between the sides; and yet this railless area, the bulk of which comprises our Provinces, contains some of the richest tracts of cotton, coal, rice, timber, etc., with potentialities of no little development and expansion under the impetus of short and rapid means of communication, both north and south. The former will, of course, soon be an accomplished fact, with the Nagpur-Itarsi line in operation; and the map will show that there will then remain only a very small missing link in the south between Ballarshah and Warangal, to convert the whole into one grand trunk line of standard gauge through communication, from Madras in the south to Peshawar in the extreme north, passing through the very heart of our provinces.

5. Thus the Ballarshah-Warangal line is destined to play an important part in the chain of communication north and south; and, to our Provinces, its advantages would be incalculable. It will at once afford an extremely short and direct route to the fertile Nizam's Dominions as well as the Madras Presidency. In fact, the line is likely to revolutionise the conditions of all our trade with these parts of India, which is at present well nigh annihilated, owing to being forced through the long tortuous channel *via* Manmad.

6. As to how far the absence of direct communication with the south hampers commercial development, I should like to give you the instance of our premier industry, with which I am directly connected.

7. South India is a very large market for cotton yarns and piece goods, and we have more than once endeavoured to obtain a share of this trade; but our attempts have always ended in failure, because of the artificially enormous distance the goods have to be carried *via* Manmad, and the heavy freight charges consequent thereon. It will be seen from the map what a tremendous difference it could make, if the missing link—Ballarshah-Warangal—were to be supplied. The following typical figures show how the mileages will be affected:—

Typical large stations for yarn and cloth in South India.				Miles from Nagpur <i>via</i> Manmad.	Miles from Nagpur <i>via</i> Ballarshah.
Madras	...	...	...	1,133	680
Bangalore	...	...	...	1,031	807
Salem	...	...	...	1,255	845
Coimbatore	...	...	...	1,354	944
Madura	...	...	...	1,441	683

8. Again, the Southern Presidency and the adjacent Nizam's territory are famous for their Cambodia, and some other types of long and strong staple cottons, which they grow profusely. As you know, cultivators here are taking more and more to short-staple cotton, and we find it increasingly difficult to secure our supplies of long staple within the limits of the Central Provinces and Berar. We have practically to buy about 75 per cent of our requirements in this line either in America or other parts of India; and here, again, we can do much larger business with the south than at present, were it not for the high railway freights which raise the cost abnormally. With the Ballarshah-Warangal line these cotton centres can also be brought within considerably easier reach, as the following will show:—

Typical large stations for staple cotton in South India.				Miles from Nagpur <i>via</i> Manmad.	Miles from Nagpur <i>via</i> Ballarshah.
<i>Madras Presidency.</i>					
Nandyal	...	...	...	948	601
Tirupur	...	...	...	1,323	913
Dindigul	...	...	...	1,403	989
Virudupati	...	...	...	1,458	1,054
<i>Nizam's Territory.</i>					
Dharmabad	...	...	...	619	494
Umri	...	...	...	602	513

9. Of course, the advantages even to the cotton industry will be reciprocal. The cotton mills in Southern India will be able to buy the Central Provinces short-staple cotton, the best of this type throughout India, and cheaper freight might enable them to cater for our markets effectively in manufactured goods as well.

10. Similarly, the trade in various other commodities is bound to be fostered, by the railway mileage being brought down to a level commensurate with the natural geographical distances. Besides, it is a matter of common knowledge, that new railways planted in fertile tracts, affording direct means of communication with large consuming markets, lead to lines of development and evolve forces of progress in their train, the end of which it is impossible to foresee.

11. Apart from its undoubted commercial advantages for our Provinces, this small link will do away with the present hardships of travel to the Southern Presidency. It takes over two days to reach Madras from Nagpur, even by mail or express trains; but a Madras-Delhi through express *via* Nagpur, which will be a certainty with the Ballarshah-Nagpur line, could accomplish the journey to Nagpur in some twenty hours.

12. The link will, further, be an admirable one from a strategic point of view, as it would at once complete the chain of one-gauge direct communication north to south, traversing the whole length of the country.

13. With all these advantages, and its immense possibilities for good, it is very curious this project of linking up Ballarshah with Warangal, once said to be well on the *tapis*, has been practically shelved, for reasons best known to the responsible

advisers of the Government of India. Sir T. R. Wynne, the late President of the Railway Board, recently stated in His Excellency the Viceroy's Council, that the line had been completely surveyed, but he could not say whether it would be constructed at all. In this connection, the well-known Calcutta commercial weekly, *Capital*, makes some pertinent remarks in its issue dated 23rd ultimo. It says:—

"Calcutta will naturally draw all the traffic and business it can, but its capacity of absorption will have some physical limits; and it will be necessary to provide for other outlets. England's prosperity is not dependent on that of a single town or port, but on many. Madras may well agitate for a share in the business. It is evident from a glance at the map of India that it only requires a few missing links to provide a through north and south grand trunk communication on the broad gauge, between the United Provinces in the north and Madras and Colombo in the south

"An obstacle to this is to be met in the Nizam's (Hyderabad) Railway policy, which has been to spend money through the agency of the Nizam's State Railway Company in making the Godavery Valley Railway on the metre gauge, which supplies only a local want. 120 miles of broad gauge between Warangal and Chanda lies wholly in the Hyderabad State. It forms the most important link to be supplied in a north and south trunk line. For some reason, not completely explained, this link is supposed to prejudice the narrow gauge railway, if made. Except for local purposes, the Godavery Valley Railway is at the mercy of the Great Indian Peninsula Railway. By connecting at Chanda, the Nizam's line gets in touch with the Bengal-Nagpur Railway and encourages trade with Madras. It becomes a very important factor in all through traffic, when the developments in course of formation, north and south, are fully matured.

"The Bengal-Nagpur 2' 6" gauges, running north from Chanda to Jubbulpore, have little traffic from want of a north and south objective. Let the Hyderabad State link be made and they may be swamped with traffic to and from Madras, and their conversion rendered imperative. It is evidently Hyderabad that is stopping the way to the North and South Grand Trunk system, with its antiquated Nizam's State Railway contract. If progress is to be made, it will probably require the assistance of an independent company with an up-to-date contract."

14. The above gives one some indication of the difficulties in the way of the new line; and, incidentally, it also shows what decided views people interested in trade and industries hold as to the possibilities of the Warangal-Ballarshah (Chanda) connection, and its necessity for the full development of the existing lines as well. The same writer, in another issue of *Capital*, dated 11th June 1914, considers this connection to be in every respect much more urgent, both from the Madras as well as the Central Provinces point of view, than the Raipur-Vizianagram line which was so much heard of in the past, but work on which is also entirely suspended after the opening of a very small section from the Vizianagram end, some years ago. He writes:—

"As far as Vizagapatam harbour is concerned, we find that a connection with Raipur, however much it must have been pressed on the attention of the Government of India, is still marked on the maps with a dotted line, the funds for it being apparently diverted under the pressure of the agitation for wagons and rolling-stock exercised from Calcutta. It is not clear that this connection demands a first place in the railway programme of construction The interest of Madras, in the main, lies in the connection of Warangal with Chanda and Nagpur If Madras wishes to rise to a real sense of her dignity as an important jewel in the Imperial diadem, she will agitate for the through connection with Upper India by an uninterrupted broad-gauge route."

15. The Railway Board are not likely to spare the large funds required for some 400 miles of the Raipur-Vizianagram Railway for a considerable length of time, and have made it quite clear that this line must await other urgent needs. I submit, this, coupled with the fact that the Ballarshah-Warangal line is a very short length of some 150 miles and is much more necessary for the development of trade between the Central Provinces and the south, as well as south and upper India, makes its immediate construction doubly necessary.

16. I have, therefore, now the honour to request you, as the officer primarily responsible for the fostering and development of agriculture and industries in these Provinces, to move the Local Government to use their influence with the Government of India with a view to have this small link between Ballarshah and Warangal sanctioned, and constructed by one or other of the railways concerned, or by any other agency, as soon as possible. As one who was intimately associated with the trade and commerce of this country, during his official connection with the Government of India for several years, Sir Benjamin Robertson will hardly need any arguments to convince him of the necessity of this line, and all it means for the Provinces under his charge. And, looking to the important interests at stake, any differences with the Nizam's Government are not likely to be incapable of friendly adjustment, especially when it is remembered that the line will benefit His Highness' Territory as well, and that we are fortunate in having at the head of the Government of India a diplomat of diplomats in the person of the present Viceroy.

Trusting you will take up the matter with the Local Government as soon as possible and awaiting an early and favourable reply.

Correspondence No. 2.

Re the short gap between Parassia, the terminus of the Pench Valley branch of the Great Indian Peninsula Railway, and Khirsadoh, on the Bengal-Nagpur (narrow gauge) Railway.

No. 459, dated Nagpur, the 31st August 1915.

From—KHAN BAHADUR SIR BEZONJI DADABHOY MEHTA, Kt., Manager, Empress Mills, Nagpur,

To—A. M. CLARK, Esq., Traffic Manager, Bengal-Nagpur Railway, Calcutta.

As you must be aware, the Pench Valley branch of the Great Indian Peninsula Railway Nagpur-Itarsi extension is to be opened next month for all descriptions of traffic. The terminus of this branch—Parassia—is, I understand, only about $1\frac{1}{2}$ miles from the Bengal-Nagpur Railway narrow gauge station, Khirsadoh, and I trust you will arrange for this small connecting link being made up as early as possible. In fact, looking to the trifling cost at which this tiny link will at once afford a means of direct and considerably shorter through communication to your main line and all the narrow gauges converging at Itwari with the various sections of the Great Indian Peninsula meeting at the important junction of Itarsi, I should be surprised if the project has not already engaged your Agent's attention. A junction of the Great Indian Peninsula and Bengal-Nagpur Railways at Parassia will be mutually advantageous to either line as well as the general public, and I trust the Bengal-Nagpur Railway with its characteristic enterprise will see that it is not long delayed.

No. 12779, dated Calcutta, the 1st November 1915.

From—G. C. GODFREY, Esq., Agent, Bengal-Nagpur Railway,

To—The Manager, Central India Spinning, Weaving and Manufacturing Co., Ltd., "The Empress Mills," Nagpur.

Mr. Clark has handed over to me your letter to him No. 450, dated the 31st August 1915, in which you advocate the linking up of the Bengal-Nagpur Railway narrow gauge line with Parassia station on the Great Indian Peninsula Railway broad gauge line. This matter has already had my attention, and a year ago I expressed my views on it to the Hon'ble the Chief Commissioner; at that time I reported that I did not think the connection would serve any useful purpose as the two railways had their own lines over which to carry coal, and as for through booking in other kinds of traffic I could not foresee any prospects.

In your letter to Mr. Clark you indicate that in your opinion the line will be advantageous to the public and to the railways; I shall be very glad to receive your more detailed views on the matter and your suggestions as to what sort and kind of traffic is likely to benefit from it.

Thanking you in anticipation.

No. 1384, dated Nagpur, the 20th November 1915.

From—KHAN BAHADUR SIR BEZONJI DADABHOY MEHTA, Kt., Manager, Empress Mills, Nagpur,

To—The Agent, Bengal-Nagpur Railway Co., Ltd., Kidderpore, Calcutta.

I beg to thank you for your kind favour No. 12779 of 1st instant regarding the proposed through connection of the Great Indian Peninsula and Bengal Nagpur-Railways at Parassia.

I was not aware that the Hon'ble the Chief Commissioner had approached you on the subject, nor had we had any communication with Government on the subject. This will show you that there are independent opinions as to the desirability, if not quite the necessity, for the linking up both the termini. We believe Messrs. Shaw Wallace Company of the Pench Valley Coal-fields are just as anxious that such a facility would help traffic.

It is difficult to enumerate beforehand what description of traffic and how much of it may be encouraged; but you know development follows the easiest routes.

It struck me that while the Itarsi-Nagpur line is building, the construction of which is now being retarded and may be delayed for years owing to the unrighteous and cruel war now raging, it might be possible for us to book our large traffic for Cawnpore, Delhi and Amritsar by this new route as it would save over 200 miles of haulage, and therefore might well permit of relatively cheaper through rates. We might also be able to send

a good part of our goods to Itarsi and several other stations in the neighbourhood. Then there might be grain and other traffic from Chhindwara and Seoni and other stations on your narrow gauge line which may find an outlet by the proposed route.

May I venture to add that it would indeed be a great pity to leave such a short gap between the two termini, offering obstruction to traffic which would in all probability largely develop but for the difficulty of transport by carts over a small distance?

Trusting this may receive your favourable consideration, and thanking you again for your courtesy.

Note on the Empress Cotton Mills, Nagpur.

The Empress Mills, Nagpur, has been the pioneer of the cotton industry in the Central Provinces. It has grown from a small beginning to be the largest cotton manufactory in India with five separate mills comprising in all over a lakh of spindles and 2,200 looms with preparatory, bleaching, dyeing and finishing machinery, and working with a capital, reserve funds, and loans aggregating about 2½ crores of rupees.

The company was formed and registered in Bombay in 1874 with a capital of 15 lakhs divided into 3,000 shares of Rs. 500 each.

The mill started work in 1877 with an equipment of about 30,000 mule and throstle spindles and 500 looms. There were considerable difficulties in regard to labour in the beginning, the mill being the first industrial joint-stock venture on this side of India, but the untiring energy and genius of its founder, the late Mr. Jamsetji Tata, who personally supervised its erection and working during the first few years, overcame every obstacle, and the company was soon in a position to earn large profits. The success since attained is unique in the annals of Indian cotton industry.

In 1912 extra capital to the extent of 50 lakhs was raised by the issue of 10,000 5 per cent cumulative preference shares. This rate is considered the lowest ever paid on this description of shares issued by an industrial corporation in India.

The company has out of its profits added Rs. 31,87,500 to its capital, giving fully paid-up shares free to the shareholders in proportion to their original holdings; and thus raising the capital from Rs. 15,00,000 to Rs. 46,87,500.

It has paid Rs. 2,80,18,131 in dividends to date.

It has further been able to build up entirely from the profits the following reserve funds:

	Rs.
Reserve fund	8,05,719
Equalisation of dividend fund	5,14,271
Depreciation fund	35,51,570
Insurance fund	16,33,404
Pension fund	2,97,277
Provident fund	2,14,644
	<u>70,16,885</u>

Thus, the total profits up to 30th June last, exclusive of Rs. 7,66,875 paid as preference dividend during the last four years, aggregate Rs. 3,82,22,516 or over 25 times the original ordinary capital.

The original shareholder has consequently gained, by being the first fortunate allottee of a share in this company, 205 shares free; and his first investment of Rs. 500 is thus, with these 205 shares given him gratis, worth to him Rs. 7,015 at the present rate of Rs. 2,300 and has brought him Rs. 9,339 in the shape of dividends.

The company possesses about 105 acres of landed property in Nagpur and other places. It has mill buildings, godowns, bleach and dye-houses, ginning factory, residential quarters for staff, etc., covering an area of about 10 lakhs square feet in Nagpur alone. It also possesses seven ginning factories, together with cotton baling presses and land, buildings and godowns appertaining to them, in the cotton districts. The total value of the immovable property is Rs. 31,45,948.

The plant consists of 100,354 spindles and 2,200 looms with all preparatory, dyeing, bleaching and finishing machines of the best type. The dye and bleach works and the latest extension, *vis.*, mill No. 5, are driven electrically. The total value of the movable property is Rs. 66,56,002.

The average number of work-people employed is over 8,000.

During the cotton season about 600 operatives are employed at the ginning factories.

The company has over a dozen agencies for purchasing cotton and some 30 agencies scattered all over the country for the sale of its manufactures.

The average dividend on the paid-up capital since the commencement comes to 21.59 per cent per annum, which works out to 47.89 per cent on the originally subscribed capital.

The company has from the first adopted the principle of setting aside adequate sums for depreciation of property ; and though nearly the whole of the machinery in the older mills is renewed, the best and newest of its kind with all the latest improvements having been set up, and the buildings kept in a thorough state of repair, the depreciation fund still stands at a very satisfactory figure.

The property of the company being extensive the annual premium of insurance comes to a very large sum, and the company contents itself with partly insuring with the insurance companies and carrying the remainder of the rateable premium to its own insurance fund. It is thus to a large extent its own underwriter. The total insurance fund which has been built up entirely out of the net premiums saved on uninsured property now amounts to over 15 lakhs. The company has been most careful in taking every possible precaution against fire risks. The buildings are all shed ones divided into blocks, and the company has provided automatic sprinkler installations all over the mill as well as all other appliances for putting out fires as its own experience and as the fire insurance offices have from time to time suggested.

It has built up a workmen's pension fund partly out of profits and partly out of the amount of unpaid wages, which latter item is wholly credited to this fund. From this fund pensions up to half the average monthly earnings, subject to a maximum of Rs. 7 per month, are ordinarily paid to all the operatives who have served over 25 years and are able to do so no longer. Besides, special pensions are also awarded in cases of exceptionally long and meritorious service. The total number of pensioners on the rolls at present is 49, drawing in the aggregate Rs. 480 per month.

From the pension fund small increments of Rs. 1½ per month in addition to the usual earnings are paid to all operatives who have completed 20 years' service. The total number earning such increments is 142 to-day.

We have also a provident fund for the benefit of all employes whose earnings exceed Rs. 10 per month. Contributions are optional. The members contribute an anna per rupee of monthly earnings ; the company ordinarily contributes a like sum to the credit of members, and allows interest on both at 6 per cent. There are 650 contributors who annually pay in about Rs. 20,000 and the total sum standing to their credit, including the company's contributions with interest, aggregates Rs. 4,12,000. Members leaving service in less than 20 years are not allowed the benefit of the company's contribution, but only the interest on their contributions.

Copies* of the pension and provident fund rules are annexed.

Government have established two factory schools for the elementary education of half-time workers in the neighbourhood of the mills. The company contributes Rs. 50 per month towards the maintenance of these schools besides providing slates, pencils, books, etc., free to every child. Besides, with a view to encourage regular attendance, a bonus of four annas is paid by the company to all children who attend the schools every day during the month. The total number of half-timers receiving instruction in the two schools is 360, of whom about 300 earn the regularity bonus.

The company also maintains an elementary vernacular school teaching up to the Gujarati fifth standard for the benefit of the children of the staff who are charged a nominal fee. This school is attended by 45 pupils.

We have a system of apprenticeships for training up our own men from the start for all positions. All our heads of departments, foremen and other assistants with very rare exceptions have been entirely trained at the mills. Besides, about a hundred men trained here have left us to join other concerns on higher salaries as managers, heads of departments, supervisors, etc. Copies* of apprentice-agreements for different classes are also annexed.

We have recreation and reading rooms for the superior officers and staff who are all provided with decent sanitary quarters round about the mills.

We have also a system of annual prizes for skilled and efficient work and regularity in attendance. These prizes are awarded on the results of competitive trials or on the basis of the highest monthly production or the utmost regularity in attendance, also for general skill and proficiency as suited to the various classes of labour concerned.

Monthly cash bonuses of a rupee or more are also allowed in almost all departments, where fixed wages are paid, to those who regularly attend every working day.

All these incentives to skilled and steady work in the shape of bonuses, prizes, increments, pensions, etc., are being appreciated by the better classes of employes, but the larger proportion are notoriously unsteady in occupation and irregular in attendance.

About 15 to 20 per cent is the daily proportion of absentees. The operatives habitually take a couple or more days off besides periodically going away for months together to their up-country homes, or to other lighter occupations. It was calculated some years back that the entire population of the mills changed, *on an average*, every eighteen months. Hence the very small number of pensioners and increment-earners in spite of the mill being in operation for 40 years. A large proportion of those who are taken on as new men are usually ex-employés who return after an absence of some months or years. With the demand for labour falling habitually short of the supply the men, specially the skilled artisans, are masters of the situation and have to be taken up whenever they choose to come.

We have a grain shop opened for the benefit of the work-people where grain is sold to them at cost price on credit. The monthly purchases are deducted from their wages on pay-day. The shop is very popular, the annual sales therein aggregating about 1½ to 2 lakhs. In famine or scarcity times, the prices charged are below market rates, the company bearing the loss. In one year of exceptionally high grain prices this loss came to about Rs. 55,000.

A plot of land measuring about 4½ acres was leased by us from the municipality some ten years back with a view to build quarters for our work-people. A number of chawls have been built accordingly, but these failed to attract our men and the experiment had to be abandoned. They prefer to build or live in their own huts in different localities and in the neighbourhood of the dwellings of their caste-fellows, friends and relatives.

The company, as stated at the outset, pioneered the way for the cotton industry in these provinces. It was the first in India in adopting and successfully demonstrating, when even the English spinners looked askance and were in doubt, the vast superiority of ring spindles over throstle spindles and for such counts as are ordinarily being spun in India, over even mule spindles. It was also the first in India to provide its mills with sprinklers for automatically extinguishing fires. So has it been the first in India in adopting, in its mills, humidifying and ventilating apparatus of the best kind available. It is the only one so far as is known having a regular pension and provident fund scheme for its operatives.

The following accompaniments to this note are not printed :—

- (1) Provident fund rules.
- (2) Pension rules.
- (3) Agreement form for graduate apprentices (to be trained as managers or heads of departments).
- (4) " " ordinary apprentices.
- (5) " " mechanical engineering apprentices.
- (6) " " technical college textile graduate apprentices.
- (7) " " " " electrical graduate apprentices.

Note on Calico-printing.

This is a promising industry for India. It has already been attempted on a small scale, but in almost all cases has been found a failure. I have only lately seen a small plant working in one of the Bombay mills which is reported to be a success. I doubt, if such comparatively tiny installations as are usually contemplated as appendages to spinning and weaving mills, are at all likely to flourish or contribute to the building up of this industry in India. These will have little chance of successfully competing with a vast and highly-organised European industry. In the first instance, highly-paid European experts would be necessary for working the printing machines, mixing colours and working out and engraving designs on rollers, and, efficient working premises, the cost per unit of output would be disproportionately high for small plants.

The vicinity of the Tata Hydro-Electric Company's Power Station at Khapoli, on the Great Indian Peninsula Railway only a few miles from Bombay, would seem to be an ideal site for the establishment of one or more large bleaching, dyeing and printing works. Land would be very cheap and an unlimited supply of water which practically runs to waste from the turbine outlets would be available. Besides, there are possibilities of building up a large and efficient industrial colony far away from the unhealthy surroundings, temptations, etc., of city life. The industry is certainly worth investigation by the Industrial Commission.

Additional Written Evidence.

System of apprenticeship at the Empress Mills, Nagpur.

We have adopted this system since the mills started work in 1877.

At first, we took up young men who had passed, or in some cases studied, up to the matriculation examination, on Rs. 10 per month for a term of three years with bonuses of Rs. 125 and Rs. 250 for the second and third years, respectively, and an option on the part of the company to retain their services for two years more on Rs. 50 per month.

The present terms for the same classes of apprentices for the spinning, weaving and other departments are Rs. 25 for the first three years, Rs. 35 for the fourth, and Rs. 45 for the fifth year. For mechanical engineering apprentices these are Rs. 25 till the passing of 2nd class engineer's examination and service for five years thereafter, Rs. 50 per month being paid for the first two years and Rs. 70 for the remaining three.

From 1887 we began taking up a few University graduates for being trained up as managers or heads of departments. The terms for this class were Rs. 50 for the first year, Rs. 75 for the second and Rs. 100 for the last three years. These are the same to this day, with the exception that Rs. 125 per month is being paid for the fifth year.

Only recently we have commenced taking up the Bombay Victoria Technical Institute graduates as apprentices on special terms. These are for manufacturing departments Rs. 35 at the start rising to Rs. 75 with annual increments of Rs. 10, and for electrical engineers Rs. 40 in the first, Rs. 50 in the second, Rs. 60 in the third year and till passing the second class mechanical engineer's examination, with service for five years, thereafter, Rs. 80 being paid for the first two years and Rs. 100 for the remaining three.

We prefer to take young men direct from schools or colleges and train them up in our own way. We have experience of only a few technical college youths, who were taken up on our ordinary terms prevalent at the time. Their equipment cannot be compared with that received at the mills, but after being grounded in practical work just like others, they have shaped very well.

The total number of youths who entered into apprenticeship agreements with us for the past forty years aggregates 202, of whom 39 left us owing to ill-health or other causes in less than a year, 5 died in the company's service, and 64 are with us at present as heads of departments, assistants, foremen, etc., or in course of training. The remaining 94 who left us after being trained at the mills are accounted for as follows:—

Managers or heads of departments in other cotton mills.

Managers	...	10	
Spinning masters	...	7	
Weaving "	...	6	
Carding "	...	5	
Engineers ...	...	5	
Dyeing and bleaching masters	...	2	
			35
Assistant masters or engineers, etc., in other mills and factories	...	...	27
In other occupations	...	...	19
In occupations unknown	...	...	13
Total	...	94	

Of the 23 University graduates taken up-to-date 10 are with us at present, 1 being spinning master, 1 weaving master, 1 dyeing and bleaching master, 1 assistant spinning master, 1 assistant manager, 1 assistant dyeing and bleaching master, 1 assistant engineer, and 3 in course of training. Of the remaining 13 who left us 6 are managers, 2 weaving masters, and 1 spinning master of other cotton mills; 2 are in other occupations and the whereabouts of 1 are unknown.

Our two chief engineers, one of whom has been in our service for forty years and the other one over thirty, both started their career in the ordinary grade of apprentices on Rs. 10 per month.

The 64 men of the apprentice class now in our service are employed as follows:—

Engine Department.

Chief engineers on Rs. 475	...	2	
Assistant engineers on Rs. 70 to Rs. 245	...	9	
Apprentices in training	...	5	
			16

Spinning Department.

Spinning master on Rs. 800	...	1	
Assistant spinning masters on Rs. 250 each	...	2	
Foremen and assistants on Rs. 55 to Rs. 185	...	11	
Apprentices in training	...	6	
			20

Weaving Department.

Weaving master on Rs. 550	...	1	
Assistant weaving masters on Rs. 150 and Rs. 250	...	2	
Foremen and assistants on Rs. 45 to Rs. 120	...	4	
Apprentices in training	...	6	
			13

Dyeing and Bleaching Departments.

Dyeing and bleaching master on Rs. 400	...	1	
Assistant dyeing and bleaching masters on Rs. 150 and Rs. 215.	...	2	
Assistants on Rs. 60 and Rs. 80	...	2	
Apprentices in training	...	3	8

Office.

Assistant manager on Rs. 450	...	1	
Assistants on Rs. 95 to Rs. 120	...	5	
Apprentice in training	...	1	7
Total	...		64

Oral Evidence, the 18th December 1916.

President.—We value your advice very much based as it is on experience of a unique kind in India. Your note gives a good deal of material to think over. We shall take every opportunity of discussing this question of shipping and ship-building with other people who can supplement your views. The great difficulty in the way is the absence of anything like steel-plate manufacture in the country. About railway facilities we had a little fight to a finish somewhere about 1906-07 in the matter of the Nagpur-Itarsi line, and Mr. Low will note the suggestions and also the other proposition about the extensions southwards between Warangal and Ballarshah. About the cotton industry we will discuss the matter with the agricultural experts and see if anything can be done. I understand that a certain amount of long staple cotton is already grown in Sind and other places. Regarding the forest question you have struck a point which we have discussed with previous witnesses. It turns almost entirely on the question of extraction of forest materials. There are many difficulties in the way such as the absence of light railways, suitable roads, and these stand in the way of development and marketing. Your note about Calico printing opens up a question about which we shall have to re-adjust our ideas. And then as regards the hydro-electric schemes, we have been accustomed in peninsular India to water-flow in the rivers which is intermittent; there are floods in the monsoon and the rivers are dry in the summer. We have got obviously to recast our notions and look at things from different points of view. If more hydro-electric schemes are developed, of course, we shall have more cases of that kind to consider.

I do not know if any of my colleagues would like to ask you some questions. I suppose you would not mind having an informal talk with us. Some of the members who are away have lost this opportunity. I know they would all like to express to you our congratulations for the success of your enterprise which is opening out a new field in the Central Provinces. You have done a great deal of credit to Mr. J. N. Tata who, if he were alive, would give you credit for your genius and ability which have given such splendid results.

Mr. A. Chatterton.—*Q.* In the course of the Commission's tour we have had a great many witnesses who are in favour of extending technical education through the agency of the university; that is to say, in some form or other connecting the technical colleges with the universities, but from a glance at the additional note you have sent us it appears that to a large extent your mills are running under the control of men who are mainly drawn from other classes than the *university* graduates?—*A.* Yes.

Q. Apparently you have established an apprenticeship class and that at any rate a very large number of highly paid managers and assistant managers, not men who are in charge of the scientific departments of the mill, have not had a university education?—*A.* There are graduates and we have also matriculates. We have two classes. You will find that the higher service is manned by graduates from universities and others are matriculated students. We take them from the colleges and schools directly and train them up to the point that we require.

Q. In the apprenticeship classes how many are graduates?—*A.* Of the 23 graduates 10 are with us at present, one being spinning master and so on as given in the note. There are others who have gone away to take up positions outside the mill and there are 64 men on the apprentice class in our service.

Q. Are not any of these 64 university graduates?—*A.* That is given in the note too. 10 out of the 64 are university graduates.

Q. The point I would like to ask is this. Do you find it necessary or even advantageous that the men who are going to be your heads of departments and foremen should have a university education or do you prefer they should begin their training in schools such as the Victoria Jubilee Technical Institute?—*A.* We prefer graduates. We prefer university

men coming direct and being trained at the mills. We find that they grasp things quickly. They have been able to manage things better. We have also tried some technical students. We found that they did not come up to the same level at least immediately.

President.—Q. What subjects should they have taken in graduation and what should be their age?—*A.* All I want is some standard of education and general culture so that they can grasp the theory and practice of any branch and so pick up all the threads thereof quicker. The age should be about 25.

Dr. E. Hopkinson.—Q. Do you want any science degree?—*A.* We would prefer men with science qualifications, but we do not for that reason refuse to take graduates in literature or other subjects.

Mr. A. Chatterton.—Q. Do your managers and technically qualified men train them?—*A.* In fact they begin work at once and they go on learning as they do the work. They begin from the lower grades.

Q. Do you have any training classes?—*A.* We have no training classes. A man when he joins us goes direct to the mechanic shop and learns filing and chipping and so on. A graduate would learn the work of one department and then begin another. The men see the work of their superiors and they learn for themselves.

Q. Do the majority of your men belong to the Parsee community?—*A.* Almost all of them. We found it difficult to take other communities because they would not stand our discipline and our rules.

Q. University education does not do much harm to the Parsee?—*A.* Not as far as I can see. In fact it helps him.

Q. Have your graduates suggested any improved machinery?—*A.* They bring to notice small details. Even unskilled men who have not had any university education do that. There is a man of the working class who was taken up as a child and who has gradually risen higher and higher. He has been able to suggest a good many improvements.

Q. Is he a Parsee?—*A.* He is a Hindu of the lower class. We encourage all such suggestions wherever they come from.

Q. You think that in this matter of giving tips graduates are no better than the ordinary men?—*A.* We have found that many graduates have grasped things and managed better.

Q. The whole of your machinery is standardised. You get the machines from Lancashire?—*A.* We have made many improvements. If after trial we think that any improvements are needed we make suggestions accordingly the next time that we order similar machinery. If you were to look at our orders you will see the number of suggestions and alterations that we have made. That shows that the working men notice these defects in the machines.

Mr. A. Chatterton.—Q. Have you got any system of rewards for the men who notice these defects and suggest improvements?—*A.* If we find a man intelligent we give him bonuses.

Q. About hand-loom weaving, if I remember rightly you were speaking about it in Naini Tal. Have you supplied warps to hand-loom weavers? To trade generally?—*A.* It does not suit them to get the sized beams from us. It would be a good thing if they did that. We supply sized beams to jails and some hand-loom factories.

Q. You supplied me with long warps which I have tried on hand-looms and the difficulty I found was that they were too long. It took the weaver much too long to get through the warps?—*A.* It would not pay us to make small warps. If people wanted short warps we shall have to cut them.

Q. Have you tried any experiments in Nagpur itself in developing a market for the warp?—*A.* We are afraid of doing that. They would fight shy of us and would be afraid that we were going to deprive them of their living.

Q. It has been said that hand-woven cloth is much more durable than the machine-made cloth. Have you any reason to think that it is true?—*A.* Yes. If you size the cloth very heavily the cloth would not be so durable as the hand-woven cloth. Of course otherwise there would be no difference. I do not think the hand-weavers could put on such quantities of size as the power-factories can do.

Q. You would agree that hand-sizing gives you a stronger yarn than slasher sizing?—*A.* I cannot say that. It all depends on the quality and the quantity of the size put on.

Q. Another question in which we are interested is whether the power-loom will drive off the hand-loom. Have you formed any opinion about that?—*A.* Power-looms have not so far been able to drive hand-looms out. Still there is a large number of the latter running. I do not know if there is any reduction. We sell over half the quantity of yarn we produce

to hand-weavers, export about a fifth to China, and weave the balance ourselves. The quantity sold to hand-weavers is thus a fairly large proportion, and this in spite of the fact that our spindles have increased from 50,000 to 100,000 during the last fifteen years.

Q. As manager of your mills you are as much interested in the development of the hand loom as the power loom?—*A.* In one way certainly.

Q. Another point which you raise in your note is about the cotton-hosiery. Do you spin cotton suitable for this sort of work?—*A.* Only a very small quantity, because there is not a large demand. If there was a good demand we should spin it specially. We make it only in special cases as the demand is so small.

Q. Is there any large demand for the Japanese hosiery?—*A.* It is spreading all over India. It is very cheap, I understand.

Q. You recommend the adoption of the methods of the Singer Sewing Machine Company. Do they sell entirely on the hire-purchase system?—*A.* Both by the hire-purchase system and also outright. They have agents in small villages also. They go out from place to place.

Q. Have they any schools for teaching?—*A.* These agents go out. When they sell a machine, they send a man specially to the customer and he shows him the methods of working the machine.

Dr. E. Hopkinson.—Q. You say that calico printing has been tried in India and has been a failure. Do you know the reasons for this?—*A.* I think the field is very limited at present. There was only one machine which I saw in Bombay. You want experts. These are not available in India. In Bombay there was only one European who was looking after the machine. Engraved rollers would have to be got out and kept in stock in sufficient quantities. Unless you have a large establishment it will not be a paying concern.

Q. Calico printing represents the highest development of the textile industry. It requires very expert knowledge. Supposing you started on a large scale, for many years you would have to import the machinists, the colourists and the engravers. But still in the face of that you advocate it as an industry to be established in India?—*A.* Yes. We had six Englishmen imported when we first started the mill in Nagpur.

Q. How long did they remain?—*A.* They remained three years. We have only one Englishman now on our staff.

Q. As regards long staple cotton you strongly advocate that attention should be given to it not only from your point of view but for Indian mills generally. Do you think that if long staple cotton were produced successfully there will be a distinct tendency towards spinning finer counts?—*A.* It would pay the mills to do that. At present they cannot get the cotton they want.

Q. You yourself are importing American cotton?—*A.* Yes. And Egyptian cotton also.

Q. Would you advocate the growing of long staple cotton even beyond the requirements of India for export?—*A.* Certainly. I think then England would not have to depend on American cotton so much.

Q. Would you endorse this as a general proposition that the higher the quality of production the more profitable it is?—*A.* I am afraid not. It would not pay so well as coarse spinning as circumstances go at present.

Q. I think you hold very strongly that there will be no great improvement in the efficiency of Indian labour except through shorter hours and higher wages?—*A.* With shorter hours we can get steady labour.

Q. Would you advocate any legislative enactment with that end in view?—*A.* There is no other way of doing it. There is a legislative enactment now. The mills are supposed to work 12 hours a day. We used to work 13 hours before this enactment.

Q. You would advocate still further legislation?—*A.* I would. I would propose 11 hours and then after a time 10.

Q. Would you extend legislation to fixing wages?—*A.* No. I think we should be obliged to raise wages. Supposing there is difficulty in obtaining labour, the workmen will demand more, and we shall be obliged to pay them.

Q. That will come about naturally?—*A.* Yes. There is no legislation required in the matter. The thing will adjust itself.

Q. You object to anything of the nature of a minimum wage?—*A.* I do not think I should advocate it.

Q. Would you advocate legislation to ensure better hygienic conditions for the people?—*A.* I think there is sufficient legislation for them. But as regards dwellings, we tried to build houses but we could not attract the people. In the case of Bombay it is quite

different, but in mofussil places people generally like to live with their relatives, friends and caste fellows in houses built by themselves. I do not know if it will be wise to legislate on the matter. It may be necessary in the city, but not in the mofussil.

Q. Have you got half-time in operation here?—*A.* Yes.

Q. I think you would say that the best possible education is based on primary education going on concurrently with the work in the mills?—*A.* I think so. There are Government schools here where the half-timers go for two hours a day.

Q. Do you think it desirable that mill-owners should be compelled by legislative enactment to provide schools for the half-timers?—*A.* I cannot say one way or the other. I think it is the business of the Government to provide schools.

Q. At any rate you agree that it might be a good step forward in the direction of compulsory and universal education?—*A.* I agree in that.

Mr. C. E. Low.—Q. Have you any knowledge of cases where these small hosiery machines have been worked successfully by individuals?—*A.* Not personally. I know a great deal of yarn is ordered by the hosiery people. I think there are some hosiery factories in Calcutta and other places.

Q. Did the same man continue the orders for yarn for any length of time?—*A.* Yes.

Q. Where was he working?—*A.* At Delhi and Cuttack.

Q. You do not know anything of the sort here locally?—*A.* There is a man who works a number of knitting machines here in Nagpur and he also buys yarn from us regularly.

Q. Do you think that an organisation like that of Singer's would be the right way of bringing it in?—*A.* It would be the cheapest and the best.

Q. Do you know what their system is?—*A.* They have agents in different cities and even in villages. When they sell the machine on hire-purchase or otherwise they send a man to the customer or the buyer to show him how to work it. In this way they have introduced it even in remote villages where the tailors can be seen using it.

Q. Supposing long staple cotton is grown on a large scale and a great proportion of it is exported, do you think that any counter-acting measures ought to be taken?—*A.* I do not think so. We are now competing with the exporters. In fact the prices are generally settled by the exporters and not by the mills.

Q. What would be the effect if a larger proportion of long staple cotton were grown and a good deal of it were exported. Do you think it would increase the growing of long staple cotton in India?—*A.* Certainly. It would all depend on whether it pays the cultivator.

Q. Supposing it pays him, do you think it would be a good thing for the country generally, looking at it from the cultivators' point of view and the mill-owners', that there should be an export demand as well as a local demand?—*A.* I think it would be good for everybody.

Q. Supposing there is only a limited quantity grown just sufficient to supply the local mills, do you think that would affect the position?—*A.* It will not be so good for the cultivators. It must be open for all and any market which pays the cultivator the best.

Q. Supposing the mills required 2 million acres of long staple cotton, and the Agricultural Department could not get more than that, do you think that in that case, leaving aside the tariff question, steps ought to be taken to reserve the cotton for the Indian mills?—*A.* I would not do anything of the kind. I would let the exporter compete with the Indian mills in just the same way.

Q. Why do you think it would be undesirable?—*A.* That would be unfair to the cultivators.

Q. That would discourage him from growing the crop if he finds that Government is interfering with him?—*A.* Yes.

Q. Therefore you are in favour of free competition?—*A.* Yes.

Q. Turning to apprentices, are the men employed in your factories all Parsees?—*A.* Nearly all of them. There are one or two other men besides Parsees.

Q. Do you know anything about a young Bengali who was sent home 4 or 5 years ago with a technical scholarship?—*A.* He was apprenticed at our mills. We had some more also but they could not stand the strain and the discipline. This did not suit them for their religious ablutions and other domestic reasons. I do not know what the Bengali gentleman is doing now.

Q. Did he come to you for employment?—*A.* He wanted more than other people. There were other apprentices who did their work very well and we could not place him above them and pay him more than them.

Q. You were satisfied with his work?—A. Yes. He did very well indeed.

Q. He would have good prospects?—A. Certainly.

President.—Q. Had he learnt anything during his stay in England?—A. He said that he could not learn more than what he had learnt here. He was very honest and straightforward.

Q. He had lost three years' experience?—A. He might have gained some experience. But he said that he learnt nothing new.

Q. So those who remained behind had the advantage over him in having gained experience?—A. Yes.

Q. Do you think that that system should be continued of picking out young men and sending them to England with State scholarships?—A. I do not see much use as far as the textile industry is concerned. They could learn here as much as in England.

WITNESS No. 147.

Mr. F. G. Sly, C.I.E., I.C.S., Commissioner, Nagpur Division, Central Provinces.

Note.—Mr. Sly did not submit any written evidence.

Oral Evidence, 18th December 1916.

President.—Q. Practically every scheme that has been put before us so far breaks down for want of suitable technical and scientific advice. We found Local Governments helping enterprises, such as tanning, with all kinds of doles, varying from Rs. 100 to 7 lakhs, and these advances have been made for technical reasons which appear to be little more than guesses; they have been made regardless of the fact that if the Government puts in Rs. 5,000 the unfortunate public imagine that the enterprise is not a mere speculation and they come in with possibly 5 lakhs. Except in agriculture and mining, the Government pioneering of industries, so far, seems to be wasted. In the absence of any system of experimental work they do not seem to learn the lessons that ought to be learned from failures. The failures are buried as decently and as quickly as the local officer can manage, as something to be ashamed of instead of something that ought to be analysed as much as possible in order to obtain a valuable lesson. It is really the result apparently of having no organised scientific services. The man conducting an experiment on proper lines knows perfectly that his failures are as valuable to the country as a success. If we are going to have any real advance, some effective "artillery preparation" in the way of scientific research must be made, extending it and organising it so as to reduce the quantity of "scattered fire" that is now going on. The scientific officers are largely isolated, each doing good work in his own little laboratory; they take up numbers of small problems, work at them for a while, and, when they get results, they are not able to follow them into practice. They go on leave with no one to take up the work on the same lines, and there is an enormous amount of valuable time and material frittered away in this fashion. We are now up against other tropical countries that have been opened up by scientific people. There is no doubt that in future our scientific men will have to be regarded as part of the defence problem, I mean not defence in actual warfare, but the bigger fight that goes on in peace time. One of the most striking cases of waste we have so far come across has been in the matter of chemistry. We find chemists employed by the Agricultural Department, as you know, at Pusa, as well as one each for the larger provinces; under the Forest Department; the Geological Survey; the Superintendent of Local Manufactures; at the Cordite factory are four or five; and the Metallurgical Inspector has one besides himself. Some of these chemists are carrying on researches that overlap; the results are published in isolated reports that the scientific public cannot readily get at. Each little chemist in his own little province is independent: the amount and kind of work that he does is left to his own conscience; but it is not a question of conscience merely, but of pace-making. We want a chemical service organised in such a way that there will be criticism of the work done and of such a size that a good man can satisfy his ambitions, and feel that what he is doing is going to lead to something else, and not merely a local result that might be buried. It should be possible to get more work out of the same staff that we have now in India. You have had a good deal of experience in this matter, because you have organised what has been, so far as we have observed, one of the most successful departments in the country, and we should like to know your views as to how we can arrange to suit the ambitions of a young scientific man who enters the department, to satisfy the susceptibilities of Local Governments who wish to have, as you know, control over their officers, and also to give the officers sufficient local knowledge to transform their scientific research work into results of practical value. One suggestion has been made and it has received a good deal of support, and that is, that we should have our scientific service organised in groups, just as the Forest Department is organised, or possibly as the Geological Survey is organised, that is to say, an Imperial Department for each technical subject or natural group of subjects. Chemistry might be one, and if we stick to our chemical illustration we might have, say, a Chief Chemist to the Government of India who would advise

Government on all chemical problems, would advise the Government too in the matter of promotion and the suitability of articles to appear in the chemical publications, the results being gathered in one journal, except that in some cases they will be repeated in other journals, for instance, chemical results of geological value in the publications of the Geological Survey, chemical results of agricultural value in the agricultural publications. But there would be one central publication that every chemist outside could refer to as a substantial and reliable guide for all chemical research done in the country. We may have this Chief Chemist on a salary of say, Rs. 3,000, with a position and responsibility corresponding to that of the Surveyor-General, and under him there might be three or four Deputy Chief Chemists in charge of technical groups, metallurgical and mineralogical chemistry in one group; organic chemistry, including the chemistry of dyes, colouring materials, drugs and oils, in another group; and another Deputy Chief Chemist in charge of agricultural chemistry. These officers would be partly at head-quarters doing research work and partly in the provinces carrying out detailed investigations for the Provincial Governments. They could be lent to the Provincial Governments as the Public Works officers or Forest officers are; and, as they became senior they could be transferred possibly to the head-quarters for the so-called higher work with better pay, possibly with administrative functions, and finally they would be available for the post of Chief Chemist. That is very shortly one of the schemes that has been put before us, and it has been suggested that the same scheme or a similar scheme might be applied to Zoology and Botany, so that no scientific man is made subordinate to another scientific man except of his own caste. How does that appeal to you? You have looked at these two points of view, and you have managed to get the best advantage of both apparently for the organisation of the Agricultural Department. I suppose you realised that at the time you organised the Agricultural Department, you had to observe economy fairly strictly, and you were limited to a very small number of men; but if we are to tackle this problem of developing India in competition with the rest of the world we have to move forward on a totally different scale?

A. I should like, first of all, to explain that I am in no way a specialist in science, and the questions which you put before me are mainly concerned with science. I was connected with the organisation of the Agricultural Department as an administrative officer, and I will give shortly reasons why the Agricultural Department was organised on its present lines. When I joined the Agricultural Department as its administrative head, one imperial research institution had already been started at Pusa. Then came a further grant of funds, and we had to decide which was the best way of utilising them. It was decided to expand the provincial departments of agriculture within the limit of the available funds, mainly by increasing the scientific staff of specialists. The principal reasons why we started on the lines of a separate staff of specialists for each province instead of a central service, such as is outlined by you, may be briefly stated. In the first place, it was considered essential that there should be thorough local investigation of the agriculture of each more or less distinct agricultural tract. We felt that any central institution, however large its staff, would never be able to undertake a thorough investigation of the conditions of agriculture in such tracts, which investigation must be continuous. Then, in the second place, we felt that the problems connected with the improvement of agriculture differ essentially from those investigated by some other scientific services, in which certain definite problems clearly await decision, and a scientist can be deputed for their investigation. The scientist had himself to make his own local research agricultural conditions, to decide for himself which were the problems requiring survey of and which gave the most prospects of success. To give an illustration from the Geological Service, we could not say that we wanted a particular coal deposit in a particular place investigated to test the possibilities of mining. The agricultural staff had to go round and find out for themselves, in the first place, what were the possible lines of advance, apply research methods to the solution of the problems requiring investigation, and when a solution was found to take steps to devise an organisation by which those solutions might be made a part of the general agricultural practice. It was considered that each province should have its own scientific staff, kept in that province for long periods, if not for the whole period of service. My own experience is that the value of an expert in the agricultural department has steadily increased with the length of time that he has been in the province, that any system of deputing experts for short periods would not be anything like so fruitful of results as a system under which the expert is kept for a substantially long period of years, if not for his whole service, investigating the same conditions and acquiring a clear and definite knowledge of the agriculture of the tract. Then, again, I think there is another difficulty in any system of centralised establishment. At least in the agricultural department, for which alone I can speak, if an officer investigates a problem and solves it as the result of his research, he himself is desirous, and rightly desirous, that he should take a practical part in bringing that improvement into actual use among the cultivators of the tract. So far as my experience of agricultural chemistry goes—you have taken chemistry as your example—I do not think that an agricultural chemist would consider it a satisfactory position under which he is sent to a province to solve a particular problem, to put before the local authorities the solution of that problem, and then have no further concern with it. It would be, I think, bad for his work and bad for the Government if he was

not retained there, if he did not take part in the arrangements for introducing that improvement into the general agricultural practice. Then, another very important factor that influenced us in starting provincial departments of agriculture was that an agricultural problem is always a complex problem. It is not a problem that deals with chemistry alone, it is not a problem that deals with botany alone, it is a problem on which the experts have to work together; the expert agriculturist, the chemist, the botanist, are all bound up together in the solution of almost every problem. You cannot depute a chemist in the agricultural department to do a particular piece of work, and say that that work is finished. He must be on the spot, the agriculturist wishes to refer to him, requires his assistance in the particular work that he is doing, and similarly the botanist's assistance is required by the expert agriculturist, and is required by the chemist. It is a complex problem on which you must have experts all working together. The agricultural service does not deal with problems perhaps so homogeneous as those, for instance, of the Geological Survey or many other departments. These are the principal difficulties that I see in the way of placing the chemist or the botanist into separate watertight compartments instead of having them, as they are at present, one whole in the agricultural department.

A. It is true that many of these scientific officers are considerably isolated in the provinces. For instance, in Nagpur the agricultural chemist is very much isolated from chemical work of other kinds, but you also have to recollect that he has in association with him other scientific officers of his own department, and I hope that in the near future there will be a substantial increase in the number of scientific officers in the provincial departments, with the result that, although the officer may be partially isolated as a chemist, I do not think that he is isolated from all other scientific work. If a stimulus is required there is a stimulus available in the work of the other scientific officers of the department who also have at least some knowledge of agricultural chemistry. There is no man in the department who has not some knowledge of agricultural chemistry, although he may not be a specialist in that particular subject, and as the department extends I think that influence will increase a good deal.

A. Then in regard to the co-ordination of the work of the department, the scheme included a Central Research Institute at Pusa which was intended to be a centre of advanced research dealing with problems of wider scope and of a more purely scientific character than those which would be taken up by the provincial staffs; and we hoped to get at Pusa the best agricultural chemist, the best economic botanist and other experts, who would be able to guide and assist the provincial staff. This part of the scheme has to some extent failed, because hitherto they have not had at Pusa scientists of such outstanding reputation in their particular science that their opinions would be accepted and welcomed by the provincial experts. In order to avoid overlapping in the work of the different provincial departments, for instance in order to secure that the chemist at Nagpur should not be duplicating the work done by the chemist at Lahore, the Board of Agriculture was instituted, to which every branch of each provincial department had to submit a programme of the work they intended to perform; these programmes were subjected to the scrutiny of the Board to see whether they could be improved, and also to see that there was no overlapping so far as it could be avoided between the provincial departments. It was hoped by these means to avoid some of the difficulties that you mention in the organisation of the department. Under your scheme of a separate chemical service, for the reasons which I have given, it seems to me that it would be very difficult to include the agricultural chemist, unless your scheme contemplates that an agricultural chemist should be deputed to a province for a very substantial period.

Q. Not less than ten years?—A. Probably longer than ten years, and in that case I am not quite sure that any very great advantage would result from having these chemists removed from the Agricultural Department and placed in a separate chemical service. One advantage may be that they would have at their head a distinguished chief chemist who would guide their work. Well, as I said, the intention of the Agricultural Department was that this function should be filled by the Agricultural Chemist at Pusa. The heads of the branches of the Central Chemical Department would presumably be men of such outstanding scientific reputation that the majority of the staff would be willing to accept their guidance. But there would also be considerable risk of practical difficulties in the working of the scheme. A chemist belonging to a department which is not agriculture will be deputed to do work in the agricultural department, and it seems to me that in many cases there is the possibility of conflict between the interests of the two departments, that for instance the agricultural department would desire the chemist to take up a particular line of work in chemistry from the point of view of agricultural benefit, whilst the chief chemist might consider that this man could be more profitably employed in other directions of work, with considerable chances of friction in the working of these services. It does not occur in the Geological Service because that department has problems which appear to be much more homogeneous and not concerned so intimately with the other branches of the administration and, therefore, the Local Governments cannot, so far as I can see, come into conflict very much with the views of the Director of Geological Survey. Whether the chemists of other departments can be combined into a general chemical service I hesitate to express an

opinion, because I have not got sufficient scientific knowledge. There are the professors of chemistry in the Education Departments, and I do not know if it is contemplated that they should come into the scheme. Then you have got chemical examiners employed in the medical service, who might be included in the general Chemical Department. There are also some chemists employed in the Assay Department.

Q. The Assay Department would come into the metallurgical and mineralogical group. Chemistry falls into three fairly natural divisions, and they are big departments. The real problem is whether you want the department to be big enough to give a man scope for his ambition. The difficulty that I have noticed at present is that your agricultural chemist or other scientific men have no hope beyond a general promise that they will be considered again when they reach their maximum pay. They may get to Pusa, but they may never be the Agricultural Adviser to Government?—*A.* Hopes for the future may be hopes of material prospects or hopes of future scientific reputation. So far as material prospects are concerned, that has been inquired into by the Public Services Commission, and what is considered a sufficient remedy has been recommended.

Mr. C. E. Low.—Q. Is it a fact that the remedy suggested by the Public Services Commission does not offer the prospects suggested by the President? The head of the department would be paid Rs. 3,000 and the Deputy Chief Chemists Rs. 2,000 each. The scale would be parallel to that of the other departments of the first grade in the Imperial cadre?—*A.* I am precluded from saying more than that the Public Services Commission has made recommendations which it is believed will result in adequate pecuniary prospects to the class of men which it is desired to recruit. What will be the conditions after the war, of course, is an entirely different matter.

Q. Of course in the case of agriculture you have to regard the local conditions of soil and climate more scrupulously, and you have established customs to be dealt with. The man must know the ryot as well as the soil?—*A.* Certainly.

Q. Many of the industries that we hope to see taken up will be less affected in this way by soil and climate, and they will be more universal in their application. The raw materials will be more general in character and, of course, more easily transported from one province to another. That is why we want this question to be discussed by you from the agricultural point of view, because we realise that the weakest part of this scheme will be where it touches agriculture. If you could create a better kind of feeling among your agricultural men, a sort of *esprit de corps* as members of the Agricultural Department, whether they are chemists or botanists or mycologists, would not that be an improvement?—*A.* I think there is some *esprit de corps* in the agricultural service as the whole, and there is a strong *esprit de corps* in the staff of some provincial departments, which might be lost in a service of experts transferred from province to province. There is one consideration which I had failed to mention in discussing the material prospects. In a service liable to transfer throughout India and Burma from place to place, a substantially higher rate of pay will be needed than in a service restricted to one province in which the men have their headquarters at the same place throughout their service.

Q. The scheme that has been contemplated is something more than that of the Forest Department, where a man is practically for the whole of his service in one province while being a member of the Indian Forest Department. Any province may yield a man who becomes the Inspector-General, and any province may yield a man who becomes the Chief of the Research Institute at Dehra Dun. In the same way any province might give its best man to be Chief Chemist. There would be no chance of disturbing the men by frequent movements in that way. They would not be thrown about from one province to another. In agriculture there are many problems which may extend well into two or three and sometimes more provinces, and in that case it might be an advantage to have this Imperial department. We came across a case in which the agricultural people in the Punjab did not know what was happening in Sind and *vice versa*?—*A.* This instance seems to suggest that the Board of Agriculture has failed to exercise its function of co-ordination.

Q. The Board of Agriculture is intended to bring these together, but they do not as a matter of fact. They publish their results locally. There was, in fact, as far as one could gather, the development a little too much of individuality. We do not want to have the form of an organisation that is characteristic of German *Kultur*, but we do want to go beyond the present British system of every man going his own way, because we have here in India a clean slate, and we have fewer vested interests to break and we ought to be able to organise in such a way as to steer between the two extremes?—*A.* As regards publications I think that there is a rule that the publications of every provincial department should be sent to every other provincial department.

Q. We have heard this complaint that papers are sent to Pusa for publication, but there is no real authority to say whether they are suitable or not. They have a sort of publication committee, but I do not know whether they sit and decide what papers should be published and what papers should not be. You have in your Agricultural Department developed a fine spirit. We have been a great deal impressed with it and you have a splendid type of man. I wonder how they do such splendid work under

such discouraging conditions, because none of them has any serious hope of improving their position as officials when they become senior men. Another advantage of the system that has been suggested to us was that the chief chemist, or the chief botanist, or the chief zoologist to the Government of India, must be a man standing out among the chemists, botanists and zoologists of the world?—A. In regard to the Forest Department, it seems to me that you have a fairly close parallel in the present organisation of the Agricultural Department. There is an Indian Agricultural Service, of which all the experts are members. The agricultural chemist is a member of the Indian Agricultural Service exactly on a level in status and other respects with any other member of that service. So far as I am aware, the highest posts of the department are open both to the expert agriculturalists and the specialists. There is at present no reason why an agricultural chemist should not become the agricultural adviser to the Government of India, which is the highest post in the department at the present time. In the Indian Agricultural Service I see no reason why there should not be a thorough *esprit de corps* between the agricultural chemist, the botanist and other experts, who are all dealing with the same problem, the improvement of agriculture.

Q. I quite agree, in the absence of a higher one elsewhere. I tell you one thing that I have noticed at Coimbatore, which strikes one as the result of this form of classification. The Principal of the college is an agriculturist, in addition to him there are an agricultural chemist, an economic botanist and, I think, an entomologist. These men are heads of separate little departments with their own clerks, and the Principal of the college has no control over them. If they want to communicate with him the proper channel is through the Director of Agriculture, Madras?—A. The Principal of the Poona College of Agriculture is not an agriculturist but an agricultural chemist, and I do not think that it at all follows that the Principal must be an agriculturist. As far as I know the organisation in the Central Provinces, each specialist has dual functions. He is responsible to the Principal of the college for the teaching of his particular subject in the college. He is also a research officer carrying out independent research work, in respect of which he is not responsible to the Principal of the college but to the Director of Agriculture. In the Central Provinces at least no difficulty has arisen from this arrangement. It is certainly not the case that if the agricultural chemist desires to correspond with the Principal of the college he must do so through the Director of Agriculture. They are in the closest possible touch in their work, and I think that such a thing as correspondence between them never occurs.

Q. The members of the Coimbatore College are in personal touch with each other and they are in the same compound; but they are independent departments. The Principal of the college definitely told me that he could not give an order to the agricultural chemist to undertake any particular work in the college as he is an independent man responsible to the Director of Agriculture?—A. I do not think that is the case in the Central Provinces. I think in the Central Provinces that the botanist and the chemist are responsible to the Principal of the college that the teaching course in the college is properly conducted in accordance with the instructions and suggestions of the Principal.

Q. The agricultural chemist, for instance, at Coimbatore, objects to have anything like teaching?—A. The combination of teaching and research is a debated question amongst scientific men on which much has been written.

Q. We know there would be difficulties in every system whichever form of classification we adopt—the vertical system of subjects or the horizontal system by the application of subjects. What we are trying to get at is to balance the advantages and the disadvantages in such a way as to find which is likely to be in the long run the best form?—A. In the Agricultural Department, experience has shown that hitherto research can best be accomplished at provincial centres under the local conditions of climate and soil, and certainly at the present stage I should be very sorry to see provincial research regarded in any way as less important than the research conducted at Pusa. It must be recollected that the agricultural department is, in its infancy at the present time, mainly employed in an investigation of local methods of agriculture from a scientific standpoint, and is largely concerned with research into local problems, indeed much more elementary problems, if I may use the word, than we hope to reach after some years of development. Advanced research problems of a wider scope, problems of a more purely scientific nature have not hitherto been very prominent, because there have not been foundations on which to build those larger problems, but with progress I have no doubt that these larger problems will become of more importance in India, and Pusa will then fill much more largely the function which it is supposed to fill in the department, and will gradually attract outstanding men, whose opinions will carry full weight. When we started the Agricultural Department all the men started more or less together. The fact that X was posted to Pusa and Y was posted to a province was very largely a matter of chance, but when the department has passed through two or three generations of official life, I anticipate that only the best men will gravitate to Pusa. The Pusa staff was appointed before there was any intention of appointing a large provincial staff. There has been no opportunity for the process of selection of the most fit man for Pusa, except in one or two recent cases. It was hoped that the reputation of Pusa and the slightly better prospects which men at Pusa enjoy pecuniarily would be sufficient to attract the very best men from the provincial departments, and it was contemplated that if there was no man of sufficient

standing in the provincial departments to justify his selection, then an attempt should be made to get a man with a distinctly high scientific reputation from Europe to fill the post. It was designed on the lines that you suggest, that there should be at Pusa the best specialist in each branch, who would be accepted as the recognised authority in the particular line to whom all provincial experts would refer in cases of difficulty.

Q. We shall have the same difficulty arising from the proposal to have local Directors of Industries. Each local Director of Industries will be up against problems connected with soap, oil, drugs, tanning, sugar, alcohol, and so on. All these require independent or distinct specialists, and is it possible for the Director of Industries to employ this variegated group, one for each kind, without having difficulties, and is it likely to attract a good man, unless that man is a member of some Imperial department with prospects of rising beyond what the provinces could give him?—*A.* So far as industrial investigation goes, again speaking purely as a layman, I should think that a centralised department has advantages over provincial departments, that the problems are generally clear-cut problems of wide application, towards the solution of which one expert can devote his energies and arrive at some satisfactory conclusion. For instance, if you want to investigate a particular chemical industry, an expert chemist in that subject can be employed, and I cannot imagine that it would be a good thing for the future development of industries to have a large number of isolated experts each separately investigating the same industrial problem. So far as the industrial side of the question is concerned, your centralised scheme seems to me to have very great advantages. Speaking again purely as a layman, I should be inclined to think that any particular scientific service that it is desired to create for the investigation of industries—and there is no doubt that there is an enormous scope and plenty of practical results to be achieved—should be framed on the lines of a central department with a central head rather than on the model of the Agricultural Department. My main desire has been to show why the Agricultural Department was organised on its present lines, my belief that those lines still hold good, and that it will not be to the benefit of the Agricultural Department for its specialists to be transferred to central departments.

Dr. E. Hopkinson.—Q. We have already come across several instances where agricultural problems involving research have been given up as they could not be taken in hand by the provincial men. In one case it could not be taken in hand at Pusa, and the result was that they had either to take a particular man off from the regular work in the province or at considerable cost get a man from home. If, in this short time, we have come across four or five instances of that sort, there must be in the whole of India a very large number of problems which ought to be attacked and are not for want of adequate staff. It seems to me that the scheme sketched by the President would meet such cases admirably. It might be possible at the same time to continue the present organisation of the provincial agricultural departments by the employment of chemists and other scientific assistants who, though of somewhat lower status and ability, would continue for much longer periods as assistants in the provincial department working under the Director of Agriculture and doing the ordinary routine scientific work which must be dealt with day by day. We came across a case which required a particular investigation as to opium which would take a few months to complete. The Agricultural Chemist of Bengal has been taken away from his work to undertake it and when questioned as to what became of his regular work in his absence, he said, "It is left to take care of itself." He is now employed at Cawnpore, and is entirely divorced from his regular work?—*A.* It is the case that the staff of the Agricultural Department is quite inadequate to take up many important problems that it is desirable to investigate, because the staff is too small for the purpose. It is also the case that problems arise in the Agricultural Department which require investigation by special experts and hitherto few such specialists have been employed. A considerable advantage would accrue to the Agricultural Department from the creation of a corps of chemists organised in a central establishment, from which the Agricultural Department could from time to time ask for the service of a particular man for the investigation of a particular problem, such as you say the opium problem is. But I wish strongly to deprecate any suggestion that the agricultural chemist employed by the Agricultural Department should be in any sense a man of a lower status or lower qualifications than the central department chemist. To my mind the bed-rock of agricultural improvement is the investigation of local conditions, local research into problems, and any idea of attaching to the provincial Department of Agriculture a chemist who may be thoroughly competent to make analyses but not to undertake research work would be disastrous to the department. The agricultural chemist has an assistant who does a substantial proportion of the chemical work of a lower standard, and I am opposed to any system under which the agricultural chemist attached to the provincial Department of Agriculture should be a chemist incapable of doing independent research work into agricultural problems. So far as the improvement of agriculture is concerned, more benefits are likely to result from a chemist employed in the provincial department than from a chemist deputed to investigate particular problems. I should hope that the provincial agricultural chemist would be a man of higher scientific attainments than that of the junior in the suggested chemical service. In agriculture, I believe the results will be more fruitful from a provincial staff of experts than from a central staff with an expert sent down for investigation into a particular problem.

President.—Q. How are you going to make the provincial service attractive to retain such a man?—*A.* I believe that an improvement in the prospects of service in the Agricultural Department is essentially necessary; that problem has been investigated by the Public Services Commission, which has made recommendations believed to give adequate material prospects.

Q. Do you think that it is good for the health of any scientific man that he should be retained for a long period confined to one particular class of scientific problem and with little opportunity of association with other scientific men?—*A.* I do not think it is good for a scientific man to be confined to a few scientific associates or to a few problems. So far as the Agricultural Department is concerned, we hope to see in the near future a very substantial increase in the number of scientific experts employed in that department which should broaden their outlook, and we hope also to see the scientific experts of the Agricultural Department located in centres where other scientific men are also employed and thus in a more scientific atmosphere. As regards the suggestion that they are concerned with problems of a particular class with a narrow outlook, I do not agree. The problems concerned with agricultural chemistry are so wide and varied that the difficulty is not that the chemist is confined to a particular class of work, but the work is so diverse that the chemist has not the expert technical knowledge necessary for the particular problem that arises. One advantage of the central system would be, not as you suggest that the work would be more diverse, but that the work would be more specialised.

Q. Specialised in subjects, but more diverse in application. Mr. Harrison in Coimbatore has made a very special study of paddy soils. He is confined to work in Madras. Would it not be better if he extended his investigation to paddy soils in other parts of India? It would be narrow in subject but wider in application, not geographical application?—*A.* I agree that one advantage of your scheme would be much more specialisation when you have an expert in paddy soils like Mr. Harrison.

Q. Which is the better form of classification? By subjects and narrowing the man to a subject and extending the range of operation, or extending the range of subjects and limiting the area of operation?—*A.* In the Agricultural Department every expert is overburdened. Any suggestion that the agricultural chemist in the provincial department is cramped or limited by the class of problems that he has to deal with is certainly incorrect.

*Q. Dr. E. Hopkinson.—*There are two respects in which you agree that the present organisation of the Agricultural Department has not worked out as you anticipated. One is the arrangement of the programme of agricultural research work for the whole country, in which co-ordination has not been attained?—*A.* I did not intend to imply that co-ordination had not been secured. In regard to the particular instance given to me, I wished to state that I could not understand how it had occurred under the present organisation. It struck me that it must be very exceptional.

Q. The present arrangement is, I understand, that the programme should be settled by the Board of Agriculture?—*A.* Yes; it is discussed by the Board, and recommendations made.

Q. And we have been told that the Board of Agriculture meets every two years?—*A.* Yes. Every important line of investigation in the Agricultural Department extends over two years at least, and generally for a substantially longer period. By experience it was found that changes in the annual programmes were so few that it was extended to two years, because that was considered sufficient to secure co-ordination.

Q. Do you think that the scheme sketched by the President would have advantages in that respect?—*A.* The advantage that most appeals to me is that you will have a recognised head of every branch of chemistry, a chief chemist of outstanding ability, whose guidance would be accepted by the provincial chemists. I can see great advantage in having expert guidance and assistance from a chemist of established reputation whom the provincial chemist would be prepared to accept as an authority. That, I admit, has not as yet occurred in the Agricultural Department, but I believe that it will accrue in time, and that this particular advantage can be secured in the department itself as well as by the scheme outlined.

Q. The other point is the question of publication. That probably has not worked out as you originally intended?—*A.* The scheme of publications at Pusa was started when I was Inspector-General of the Department, and also of a general agricultural journal intended for the educated reader interested in agriculture. It consisted of a series of scientific memoirs divided into subjects, such as chemistry, botany, entomology, and the like. There was also a series of bulletins, intended for matters of interest which were not of sufficient standing or importance to be included in the scientific memoirs. When the scheme was framed, it was decided that the scientific memoirs should have the first call on every scientific paper written by a member of the service. That was done with the object of building up for the Pusa Memoirs a scientific reputation which would make them comparable to the scientific publications in Europe. It was recognised that it involved a very great sacrifice on the part of the staff. As a matter of fact, we followed the Geological Survey Department in the hope that the scientific records would make an established reputation in the scientific world. So far as I am aware I think that policy has been partially successful, and Pusa scientific publications now have achieved a substantial reputation.

Q. Has the policy been entirely successful? Have all results of researches which were of value been published? Is it not possible that a good deal of valuable work has dropped out of sight and never reached the stage of publication?—*A.* If so, I should imagine that it must be the desire of the officer responsible for that work not to have it published. The scientific memoirs are conducted by an editorial staff at Pusa who decide whether the papers submitted to them are or are not of a sufficiently high standard to justify inclusion in the series of scientific memoirs; if any officer has not submitted for publication any scientific paper written by him, I can only suggest that he has some particular reason why he does not desire it to be published.

Q. Mr. Leake's botanical publications are published at home instead of at Pusa. Butler's work is almost entirely published in Germany. He actually showed me his papers published in Germany. He could not find any suitable means of publication even in England.—*A.* I have no knowledge of the present system of publication, which may have materially altered since my connection with the department ceased. I can understand that certain systematic work, such as Butler's classification of fungi, may be so specialized as to be unsuitable for publication in India.

President.—Q. The Geological Survey publishes papers relating to one single subject, so that any man who wants to know anything about the geology of India need not go beyond the Geological Survey Records. To show you how a paper or journal can establish its reputation if it is confined to a definite subject or natural group of subjects, the *Records* of the Indian Museum were started when I was Chairman of the Trustees in 1908. They have now reached something like 14 volumes, confined entirely to zoology; and in spite of the fact that its name has no obvious relation to zoology, it has established such a reputation in the zoological world that men send out papers from home to be published. That publication has established its name now as *the* journal of zoology for India, and zoologists of Europe would not look to the agricultural publications at Pusa, although there is a large quantity of excellent material published there. So that, is it not an advantage for workers out of India to have some journal that is recognised as an authority, that can be complete in zoology, in botany, in agriculture as a science, or in any group of applied sciences? You will establish your reputation at once if it is made authoritative and representative of the whole of India. You will also get exchange publications?—*A.* The last advantage has accrued to the Department of Agriculture from its own series of publications. It receives in exchange a very large number of scientific publications.

Q. Have you any objection to the combination of research and teaching work in the same institution?—*A.* No. The combination has been for good, particularly in India.

Q. You do not say that a research man becomes a better research man if he is given teaching work. You would not allow a first class research man to do simple class work teaching to meet the standard of the university? That is totally different from a research man undertaking a course of lectures on special subjects?—*A.* As I stated before, this general question is much debated even in Europe. There are some advantages in India from a combination of teaching and research, that do not occur in England. The fact that the staff is largely European and the students Indian is a strong reason in favour of research workers having some teaching in order to come in contact with the youth of the country and influencing their outlook on science.

Q. You know that the Geological Survey has been keen on the geological officers having a certain amount of teaching in some part of their history. It helps them to get a broad outlook of their profession. I would not allow the officer to teach elementary classes continuously as part of his duties?—*A.* Experts in the Agricultural Department are not intended to devote a very large amount of time to teaching. They are provided with assistants competent to undertake the bulk of the teaching work, and it was only intended that they should deliver lectures from time to time and also supervise and see that the teaching given by the assistants was good.

Q. You said that in the Central Provinces the officer is responsible for research work to the Director of Agriculture and for teaching work to the Principal of the college. Has any practical inconvenience arisen from that divided responsibility?—*A.* I have not been connected with the provincial department for several years, but I have not heard of any difficulty. The relations of the Principal and the expert staff are, I believe, thoroughly friendly. When I held the office of Director, all the staff met from time to time for discussion, forming a sort of governing body for the college.

Q. Do you know that the same thing obtains in the other provinces?—*A.* I cannot tell you. So far as I am aware, no difficulty has arisen in this province from the duality of functions.

Q. There is one other point which struck me very forcibly during these few weeks, that a great many agricultural problems have been solved in India—purely scientific problems—with extraordinary success as scientific problems, but there has been a breakdown in the application of the solution of the problems to practical results. As soon as you begin to

entrench on the industrial side and still more so on the commercial side, they frequently break down so that the scientific agricultural results have not been fully reaped. Do you think that that is an unfair deduction to make from what we have heard?—A. I do not know the conditions in other provinces, but so far as agricultural research has been conducted in this province I know no important piece of research work which has failed to give practical results from lack of organisation to introduce it into general practice. The Deputy Director would be able to give a much better and clearer account of the organisation that exists for that purpose than I can give. I think that the Central Provinces Department of Agriculture can claim with certainty that many important results have been brought into actual agricultural practice. The Deputy Director will be able to tell you how it is done. It is his organisation, and I have never heard any suggestion that it has failed. Such organisation has, perhaps, worked in this province on a larger scale than in any other province of India.

Hon'ble Sir R. N. Mookerjee.—Q. What is at present the check on the chemist or botanist in the provincial Agricultural Department, if by chance you get a bad man who is not very keen on his work or anything like that?—A. So far as check is concerned I place most reliance upon the influence of his colleagues in the department. As I tried to explain, the ordinary chemical problem is not an isolated problem which the chemist works out alone, but part of a complex problem, and his colleagues will always endeavour to get out of the chemist, to take the instance given by you, the particular investigation that they desire from that chemist. Then again, the chemist has to publish his annual report every year, which is subjected to examination by the Director, and is submitted to the Local Government. This report is also subjected to examination by the Agricultural Adviser to the Government of India just as the programme of work goes before the Board of Agriculture. You get some bad bargains in every service in the world, but there is a distinct stimulus and agency that can be applied to correct slacking.

Q. For instance, if you get a bad bargain in the Civil Service, he is pulled up by the District Magistrate and warned. In this case it will take a couple of years before the matter reaches the Board of Agriculture?—A. That is true, and it takes more than two years in the case of the Civil Service. A bad bargain in the Civil Service is perhaps not pulled up so quickly as a bad bargain in the agricultural service at the present time.

President.—Q. We have had a number of cases brought before us very prominently of work done, but there had not been anybody to check whether the work undertaken was of the proper kind?—A. I can only say that it was hoped that the Board of Agriculture would perform that function.

Q. The Board of Agriculture apparently failed in a particular case not only in controlling the actual results, but it is said that there was no one to whom the officers could appeal to act as an arbitrator?—A. There is the Agricultural Adviser to the Government of India.

Q. He happens to be a worthy civilian who is not a mycologist, chemist or economic botanist. Another thing which we found is that the assistant mycologist at Pusa is engaged, and has been practically for the whole of his service there, in doing forest mycology. It is an instance in which if these mycologists were members of a central department they could just be doing forest mycology or agricultural mycology or both. In this case the senior mycologist is doing work with direct application to agriculture, but his assistant is engaged, although he is employed in the Agricultural Department, in forest problems. I think he is actually getting his material by private arrangement from the officers of that department?—A. It is at least an instance of the entire absence of any departmental spirit in the Agricultural Department, but I cannot explain the fact.

Q. It shows that it is not difficult for a mycologist to help the Forest Department or the Agricultural Department or any other. That is why I say that it is not a disadvantage if these men are centralised in this Imperial department. They still would be available for the use of the agriculturist, and the time is coming when the Agricultural Department should have a sufficient number of men taking up cattle-breeding, and dealing with soils, agricultural engineering, growth of crops and demonstration work, forming, in fact, a compact body of scientific agriculturists. There should be a large increase in the number of scientists. And the question still arises whether you are going to develop at the same time correspondingly your agricultural chemist or botanist, or whether they are to be kept as handmaids of the agriculturist?—A. I do not agree that the use of the word "handmaid" is correct. I regard them as entirely equal, and I do not think it is correct, in the Agricultural Department, to suggest that either the chemist or the botanist or anybody also is a handmaid of the agriculturist. So far as material prospects are concerned, I cannot see that there is any very great necessity for adopting a central service. It seems to me that in the Agricultural Department you can have material prospects sufficiently good to attract the class of men that you desire.

Q. There is another point that has been brought before us. I have seen one or two specialists who do not get on very well with their Local Governments, the reason being neither the fault of the Director of Agriculture nor only of the specialist. In such a case of incompatibility of temper, it might be useful to have a central reservoir to which you

could return your chemist, or botanist, and he could be used in other provinces or at the head-quarters?—A. Every officer in the Agricultural Department is liable to transfer to any part of India, and if the necessities of the public interests require that a particular officer should be transferred from one province to another, it does not appear to me to be difficult to secure it.

Q. The central department will be responsible to accept their bad bargains back?—A. We may get nothing in exchange if we return the man who is not quite suitable. I do not think that difficulties are less likely to occur under the centralised scheme than under the present scheme. When officers are in the provincial department, they are regarded in a much more friendly and helpful spirit than the officer deputed for a particular period from the central department.

Q. That is not my experience as an Imperial officer. There will be two types—one like the Public Works officer attached to the province practically for his service, and the other type of specialist who is sent round for any particular enquiry. Both of them, if they are normally well-behaved men, will receive good treatment from any provincial head-quarters. I do not think that anything otherwise happens except to a man who ought to be treated badly, and we treat him just as badly after he returns?—A. In the Civil Service when a man is appointed to a particular province, every one of us will try our best to turn him into a good officer and put him on the right lines, to give him every assistance in our power not only officially but socially and otherwise. I think that feeling would not certainly be so strong in regard to officers deputed from a centralised office.

Q. In the case of the Civil Service you still have a small imperial reservoir, and some of you were not unwilling to go to Simla from the provinces, still carrying a very good provincial spirit with you?—A. That is entirely a different reservoir from the one suggested, a vessel to collect the best cream and not for the storage of the bad milk.

Q. The central head-quarters of this Imperial Chemical Department would have mostly administrative work together with a certain amount of research on certain problems. Some problems you can deal with only when you get material from all the provinces or many of them. These would be undertaken in the central laboratory and the analogy of the Civil Service is not so bad. Those officers would bring with them a fine provincial spirit, and the man from the Central Provinces would attempt to show and succeed in showing that he was a better man than the one who came from Bombay?—A. (No answer.)

Witness subsequently forwarded the following supplementary note.

One aspect of the question not considered in the above evidence is the provision of funds for the expansion of the Agricultural Department. Under the present organisation each Local Government is ready to find funds for the expansion of expert staff required for its own needs. A centralized scientific department would be dependent for funds on the Imperial Government alone, and Local Governments will not be so ready to urge the desirability of, and to provide funds for, an increase of staff in a centralized service, which may or may not even then meet its particular requirements.

If the advantages of the centralized services of chemists and botanists are considered to outweigh the disadvantages from the standpoint of the Agricultural Department, and the advantages are many, there should be a condition that each provincial department of agriculture should be provided by the centralized departments with a chemist and a botanist, who should be employed in that province for a period of (say) not less than ten years, unless the Local Government consents to the transfer. This condition would remove my principal objections to the proposal, which would then have my full support.

WITNESS No. 148.

Mr. D. Clouston, Deputy Director of Agriculture, Nagpur.

Written Evidence.

I have had very little experience of any industry but agriculture, and it is with a certain amount of diffidence that I offer an opinion on matters relating to other industries. But to a certain extent at least the difficulties we are up against in India are the same in every industry. Labour is cheap but unreliable. For want of technical skill and knowledge, where that is required for manipulating machinery, most industries are placed at a disadvantage. The Department of Agriculture has helped to set up a certain number of small ginning plants on certain seed farms to enable the growers of Roseum cotton to keep their seed pure; considerable difficulty has been experienced in getting skilled men to manage such plants. The department has got over this to some extent by training men in this work on one of the Government experimental farms, but this arrangement is only a make-shift and I look forward to the time when such training will be given in the engineering school in Nagpur.

The same difficulty is experienced whenever any new agricultural machine is introduced. The combined mechanical skill of a village cannot repair it when it gets out of order, and for want of skill in handling it the machine soon becomes less efficient. The department has tried to find a remedy by sending round a trained mechanic to execute repairs in the villages where such machines are being tried. This again is only a half measure. What we really want is a certain number of capable smiths and carpenters of the foreman type scattered over each tahsil. More attention should be given by Government to the technical training of such men and an effort should be made to encourage skilled mechanics to open workshops of their own at head-quarters of tahsils to start with.

My experience of day schools for short-time employes is small, but from what I have seen I am of the opinion that the standard of living and intelligence in this country is so low that there will be no real demand for education among the cultivating class at least till we can raise them in the economic scale and prove to them that education is of some practical value to them. Education in rural districts, in short, will have to wait on the economic development of agriculture.

What the landholder and his labourers stand most in need of, in these provinces at least, is such demonstration combined with training as will enable them to adopt improved methods. Schools of handicrafts of the type started in Nagpur, where boys are trained, under expert foremen working under the supervision of a highly trained superintendent, in neatness, accuracy and efficient methods of work generally should be of great practical value in raising the standard of workmanship among the class to which they belong; but we want ten times as many facilities for practical training of this kind and we want them developed so as to provide for the more complete training of men as supervisors too.

The Department of Agriculture holds practical classes on some of the Government farms for training young men in improved methods of farming. There is great scope for expansion in this direction. All we have been able to do up to the present is merely a drop in the ocean. The department which is held responsible for the development of the particular industry for which the men are being trained should also be held responsible for the quality of the training given: but where teachers are required for the teaching of special subjects, the department in charge should get the assistance of the Education Department.

To improve the labourer's efficiency generally, we want more and better elementary education, though, as I have already said, there will, in my opinion, be no real demand for education, in rural areas in the Central Provinces at least, until we have first raised the standard of living by developing agriculture, our greatest industry. We must first show the cultivator that our improved methods will add largely to his farming profits and that it is his duty to educate his children to enable them to take full advantage of the benefits which such improvements offer them. At the present stage of agricultural development the teaching of the cultivator in new and improved ways of doing things is our main concern.

As soon as trained teachers are available the teaching of nature study should be taken up in rural schools with a view to interest the child in his surroundings, and to cultivate his intelligence. Far more attention should be paid to hand and eye training too so as to train the pupil in accurate and methodical ways of doing things with his own hands. An effort should be made in all such teaching to stimulate the pupil to do things well, to do them punctually and to give him a true sense of the dignity of labour. But in the Central Provinces we have at present no teachers properly qualified to train the mind, hand and eye of the child by such a course of teaching and training. We want for this schoolmasters trained in the method of teaching such subjects: for everything depends on the method employed.

Official
organisation.

The Departments of Agriculture and Industries and the Co-operative Societies are the two organisations which as far as I know give most help in developing industries in the Central Provinces. The Department of Agriculture and Industries has always been directed by a civilian. I don't think any substantial progress is likely to be made until we get as a Director of Industries a scientist with some knowledge of engineering. In other provinces, where industries are more developed, to have a business man with a good scientist on his staff to advise him may prove the better arrangement; but for many years to come there will not be sufficient work for two highly paid men in the Department of Industries in these provinces. We want a man who can go round and advise both as regards plant required and ways and means of marketing the produce. The Director of Industries should therefore be an expert with some business knowledge as well: a good man would soon acquire the business knowledge required. The personality of the Director would be an important factor.

A Board of Industries consisting largely of men engaged in business would be useful. To start with, its functions should be purely advisory, I think.

There should be an Imperial Department of Industries under a single head with a staff of experts capable of assisting the Directors of Industries in the different provinces in the development of local industries.

The Department of Agriculture, though only one of several Government departments which are assisting the industries of the provinces, is perhaps the most important from the point of view of results obtained. The department is at present under-staffed. We want one Deputy Director for each division to carry on experimental and district work. We want, too, a larger and more highly qualified staff of Indian assistants, and a Director who will stick to the job for a period of at least 10 years. The department is yet young and we are still feeling our way; but I am of opinion that more attention should be given in future to the training of Indians in our Agricultural Colleges, in order to qualify them in research work. The rate at which we can go on developing the department will depend to a large extent on the quality of the educational work done in these colleges.

Organisation of scientific departments of Government.

The staff of the Provincial Agricultural Colleges should look upon teaching as their primary duty, and research work should be left to a larger extent than is done at present to the Imperial staff of experts at Pusa.

There is considerable over-lapping at present and insufficient control.

The Imperial Agriculture Department should always have as its head a scientist whose work has been of great practical value in developing agriculture. We want a scientist of a practical turn of mind rather than a pure researcher. In the event of such a man not being available in India inducements should be offered to attract one from home.

When men qualified to fill other posts in the Imperial Department are not available in India, they should be recruited at home, where there is a wider field for selection. It would be possible to get men who had made their mark at home to come to India for a period of 10 years or so, if sufficient inducements in the way of salary were offered.

I have devoted almost my whole time since I came to India to the development of scientific agriculture and the department has succeeded in introducing new crops, new and improved varieties of existing crops, new manures, new methods of cultivation and at least one new branch of husbandry, namely, dairying on scientific principles.

Technical aid to industries.

We have given material assistance to some of the oil-mills by creating a demand for their cake.

Cultivators have not got the reading habit as a rule. The Indian Trade Journal is not read as far as I know except by Government officials. Agricultural journals, too, are not popular even among English-speaking cultivators. The articles are too scientific to be intelligible to men whose intelligence has not been developed that way by the literary education which they got at school. The department publishes a small monthly Agricultural and Co-operative Gazette, which is, I believe, fairly widely read, judging from the queries sent in by readers. Publications of this kind should be circulated in the vernaculars as well as in English. The language should be simple, and there should always be a query column containing replies to readers asking for information.

Commercial intelligence.

I do not think that large exhibitions are of much use. Small divisional agricultural shows such as are now held every year in these provinces are educative and stimulating. The industrial side of these shows is now being improved with a view to encouraging some of the local industries. At the Raipur Divisional Show prizes were offered this year for exhibits of silk and brass-work, and an improved fly shuttle hand-loom and a potter's wheel were worked in the show yard. There is scope for the development of divisional shows on these lines.

Assistance in marketing products.

Our aim is to make these shows as educative as possible, and with that end in view we hold conferences in connection with them, at which papers on agricultural and co-operative subjects are read. To encourage cultivators to adopt improvements, prizes are given for the best exhibits of the staple crops grown in the division and of new crops introduced by the department.

The development of an industry like agriculture on which the prosperity of about 80 per cent. of the population is dependent is of such enormous importance to the country as a whole that Government would, I think, be justified in granting loans to enable cultivators to adopt improvements on a larger scale than is being done at present. In the Central Provinces takavi loans are given to cultivators for the purchase of improved agricultural implements, as well as for cake for manuring sugarcane. Loans are given to cultivators on the recommendation of the department by co-operative central banks for the purchase of improved seed and agricultural implements. The members of the Telinkheri Gaolies' Societies have also been given loans by the Nagpur Central Bank.

Financial aid to industrial enterprises.

I am in favour of a much larger amount being given for agricultural improvements both by Government and co-operative societies and central banks.

The Gaolies on the Telinkheri dairy farm have been assisted by the formation of two co-operative societies. The Gaolies were induced to bring their cattle to the Telinkheri farm from the bazar. Sheds were provided for them on the Government farm and food-stuffs for their cattle were stocked and supplied to them daily. There are fixed charges for the different kinds of food-stuffs, for grazing, for godown accommodation, and for the service of the stud bulls belonging to the department. Their milk is sold at a fixed rate to a contractor who is responsible for the distribution.

The first society was started about four years ago; a second was formed about two years ago.

The dairy has been a great boon to Nagpur and the Gaolies are contented and have gradually added to their live-stock on the farm. A school has been opened on the farm for their children and a depôt started from which they are supplied with wheat, pulse, rice, gur and other food-stuffs.

Oral Evidence, 18th December 1916.

President.—Q. You say in your note that you "have given material assistance to some of the oil-mills by creating a demand for their cake". We have had it suggested that the Agricultural Department might be able to increase the demand for oil-cake which at present is not sufficiently valued by the ryots. It is said that the ryots quite understand the value of cotton-seed as a food-stuff but that, in spite of the fact that cake is probably better for cattle, they imagine that, because the cake looks dry and hard, it is of very little use. Are you of opinion that the people are really beginning to appreciate the value of oil-cake?—A. I don't think so. They value it as a cane manure, but not as a cattle food. They have to bring it a considerable distance by rail, and the cost of freight added to the cost price of the cake raises the price above that of cotton-seed very considerably.

Q. So that actually cotton seed is cheaper?—A. Yes, they get it from the village.

Q. How are you going to get over this difficulty?—A. Am I right in supposing that it is a real waste of good material to give cotton-seed as a food, when the oil-cake might be good enough for food after getting the oil out of the seed?—A. I think so.

Q. How is the difficulty to be got over?—A. When we create a demand for cake as a cane manure, cultivators will be willing and able to pay a bigger price for it.

Q. To increase the price of the cotton-seed by a natural demand will prevent its being wastefully used as a food?—A. I think so.

Q. And then I suppose if one had greater facilities for assembling the cotton-seed, and a larger number of oil-expressing mills, there would be no temptation for the ryot to use cotton-seed as a food?—A. No, and if we can create a demand, we shall then be in a position to bring it in large quantities at a time by rail, and in that case the freight would be very much less.

Q. Have you anything to complain of in the way of the distribution of freights here?—A. We were told for instance that from Akola to Nagpur, a short distance, the charge is as great as the charge from Nagpur to Bombay; and the suspicion left in our minds was that the railway company would not allow railway facilities, *i. e.*, cheap rates to Nagpur, because they did not want the rest of the journey to be made by the Bengal-Nagpur Railway; so by increasing the rates from Akola to Nagpur, they are alleged to prevent the transmission of the seed over the Bengal-Nagpur Railway to the port. Do you think there is any possibility of that being the case?—A. I think so. We have, however, got the Bengal-Nagpur Railway to reduce freights by one-half for certain cakes.

Q. You have found railway company ready to come down when a proper case is put before them?—A. Yes.

Q. I have heard of many cases in which they have come well below the recognised rates, when the case has been presented to them, but this is a case in which no reply of a satisfactory sort could be got, and no explanation obtained?—A. That was not our experience. They reduced it by one-half.

Q. Is there any discrimination made between materials estimated on a food basis and materials estimated on a manure basis?—A. They charge twice as much freight for carrying cotton cake (a feeding cake) as for tili and castor, which are used mainly as manure cakes.

Mr. C. E. Low.—Q. Is cotton cake useful for manure?—A. It is useful, but we found that it was not as good as tili cake and castor.

Q. I should like to pursue the point about the relative cheapness of cotton seed and cotton cake as food. When you say that cotton seed is available in villages, you mean it is usually available round a gin?—A. Yes, most villages are fairly near a gin.

Q. The gins are more widely distributed than the oil mills?—*A.* Yes.

Q. Do you concentrate your efforts in pushing the sale of cake as cattle food within a cart radius of the oil mills; do you find you do better there than elsewhere?—*A.* We have not really tried to push it as cattle food at all. We have recommended it at the divisional meetings of our Agricultural Associations. A few have tried it already, but the cost is so great as compared with cotton seed that they have not continued to use it.

Q. You said that that was because of the cost of railway freight, but in a radius round the oil mills, corresponding if you will to the radius round a gin, the cotton-cake ought to be cheaper than the seed?—*A.* It should.

Q. Are the people using cotton cake as food in the radius round the Akola oil mills?—*A.* Very, very few. I think a few use it for tonga bullocks, but very few for bullocks employed in cultivation.

Q. Do you think any practical good would result from attempting the use of it as cattle food within a cart radius from Akola?—*A.* No, I don't think so. A great many of the people who get their kapas ginned at factories take back the seed. They send the kapas to the gin and take the seed back to the village and use it as a cattle food.

Q. Then you think the solution of it lies in creating a more effective demand from the oil mills for the seed?—*A.* I think that there will certainly be a demand when we start dairies. The Jubbulpore dairy is using a large quantity of it. We use a good deal on the Telinkheri dairy. If we had more dairies a demand would naturally arise.

Q. Does that cake keep better than the seed?—*A.* I don't think there is much difference. It gets a little mouldy if you keep it during the rains, but it does not lose much in quality.

Q. I should like, for the benefit of the other members of the Commission, who are much interested in this question of demonstrations, you to explain briefly what the demonstration organised in your circle is, including the functions of the Agricultural Association and the subordinate menial staff of the department under you?—*A.* It varies from division to division, but if we take Chhattisgarh for example where we have done the greater part of our demonstration work, we have there two or three assistants for each district. We have more in the areas commanded by Government tanks because of the greater scope for agricultural improvements in such irrigated areas. Each assistant is put in charge of 40 or 50 villages. He has a certain number, say, five or six Kamdars, working under his supervision who are as a rule ploughmen who have been trained in the new methods which we are introducing. These men are each in charge of six or seven villages. An agricultural assistant supervises them; while in charge of the agricultural assistant we have the divisional superintendent who goes round from time to time.

Q. Men of the Provincial Service?—*A.* Yes.

Q. What are the functions of the agricultural associations and sub-associations?—*A.* We have almost given up the District Association entirely. We now have instead Tahsil Associations. We started in each tahsil with about 50 members. They were selected from among the leading cultivators of the tahsil: meetings are held three or four times a year. We have a definite programme of work which the members carry out. We get each member to agree to do a certain amount of work; one may undertake to transplant his rice, another to grow an improved strain of seed; each man is supposed to do something in the way of helping the department, either by distributing improved strains of seed or by demonstrating new processes.

Q. What is the organisation of this association; who presides and who acts as secretary and convener?—*A.* The tahsildar is president, and there is a vice-president who is a non-official. The secretary is sometimes an agricultural assistant and sometimes a naib-tahsildar. The assistant secretary is a non-official.

Q. Are the members usually educated or literate people; take Chhattisgarh and Berar?—*A.* They are mostly literate, and are the leading landholders of their tahsils.

Q. They would be more literate in Berar than in Chhattisgarh?—*A.* Yes.

Q. Will you describe the system of cotton seed distribution in Berar?—*A.* We started first with scattered seed farms to which we supplied selected seed every year from the experimental farm at Akola which thus served as the nucleus for our seed business in the cotton tract. In 1912 we had 120 of these seed farms run by private owners. We merely supplied them each year with selected seed. They propagated it, ginned their kapas and distributed the seed to other cultivators. We found after a time that we required so many seed farms, to meet the demand for seed that with our limited district staff of agricultural assistants, we could not possibly supervise the work when these seed farms were so scattered, as we had them at that time. We therefore decided to concentrate our energies by having seed farms at definite centres and therefore started co-operative seed unions. Each union consisted of ten or more seed-growers. Each has a seed

farm, and one of the farms—the most important farm of the union—is called the central farm. All the others are called branch farms. To the central farm we supply selected seed every year from the Government farm at Akola; the central farm propagates this seed and hands it on to the branch farms of the union. The branch farms in turn propagate it and sell it to cultivators. Each union has a ginning plant, by which all the seed of the union is ginned. The plant belongs to the members. By ginning their selected strains on their own ginning plant there is no fear of admixture; nor is the seed damaged to anything like the same extent as happens when kapas is ginned in a factory where the gins are run at a much higher speed.

Q. Do you know how many individual private seed farms you have got this year?—A. We have 40 seed unions and 76 separate seed farms. We gave out this year 15 lakhs of pounds of Roseum through our own seed farms and unions; in addition there were 11 lakhs given out by other people who were not working under our control; about 26 lakhs in all were given out last year.

Q. Do you know what area was sown with the Roseum type of seed?—A. As far as we can ascertain, about seven lakhs of acres are now sown with Roseum.

Q. You recognise, of course, that in order to give the cultivator what gives him the best price at present, your department has deliberately chosen the policy of disseminating seed with a low type of staple; do you think there is any risk of over-doing the market for short staple cotton in India generally?—A. I think not. The demand is very much in excess of the supply. They are using that cotton not only in mills here, but large quantities are used by Japan, and very large quantities were exported to Austria and Germany before the war, and will be exported after the war.

Q. What do you think of the ultimate prospects, roughly speaking, of the long staple cotton in this country. What area would you say was in sight which you could reasonably act on after a term of years?—A. I don't know the conditions of other provinces.

Q. I am speaking of the Central Provinces?—A. I should think that in the Central Provinces there is no great scope for extending the cultivation of long staple cottons, except in tracts like Chhattisgarh and Chanda, parts of which are now coming under irrigation. We find that long staple cottons do very well when irrigated on light laterite soils in these parts.

Q. Do you not think that long staple cotton of the Buri type could be grown in areas like western Chhattisgarh, where the rainfall is rather high?—A. We tried it in Kawarda, where the rainfall is about 45 inches, and we got a better outturn from Roseum than from Buri.

Q. You say, "The staff of the Provincial Agricultural Colleges should look upon teaching as their primary duty, and research work should be left to a larger extent than is done at present to the Imperial staff of experts at Pusa." You believe then in the centralisation of research in the Agricultural Department?—A. I believe in that very strongly.

Q. In spite of the fact that there is a very large number of different provinces with considerable differences in soil and climate?—A. The man who is doing research work would have ample time for his teaching as well. By "teaching" I don't mean that he would spend all his time in teaching; but he would very well give one lecture each day. We have agricultural colleges at home where all our professors are doing a certain amount of research work. We have not a single agricultural chemist or botanist in Scotland who is devoting all his time to research.

Q. You mean by "teaching", teaching to a standard for a degree, and not merely the training of young men, post-graduate research?—A. I mean the ordinary three-year college course, and we might probably get each agricultural college affiliated sooner or later with a university.

Q. What advantages do you think arise from making men do teaching and research?—A. It gives much greater interest to teaching when you are doing research work at the same time.

Q. Do you mean that teaching itself is so uninteresting that you have to add to it a certain spice of research to make it tolerable?—A. I think it much better than whole-time teaching; it also gives the teacher a wider outlook.

Q. The idea has been put before us by several witnesses, with reference to the problem of industrial improvements, that it will require a great deal of chemical research in different lines, for which we do not possess the equipment. The chemists at present employed in India are scattered over numerous departments, and working in their own departments, and their work often overlaps. You have, for instance, chemists employed under the Military Department, on explosives, and you have Forest Chemists. You have the Public Analysts, the Geological Survey; in fact it would not be very easy to find a large department that has not got one or more chemists attached to it. These men are more or less in a *cul de sac*. If it is decided to entertain a large chemical staff for industrial research, oils and fats,

fibre metallurgy and the production of heavy chemicals or dyes, aluminium, etc., would it be a good thing to co-ordinate these other scattered chemists, and make them members of a single service with a chemist of high repute as Chief Chemist to the Government of India as head of the service, with a Deputy Chief Chemist as head of the various branches under which these would fall?—A. I think it is a very good idea.

Q. What do you think would be the advantages, besides the prevention of overlapping of work; do you think it would result in the maintenance of a higher standard of work and more scientific discipline?—A. More control and better prospects for the men, and having at the head a man who is recognised as a scientific man of reputation would do the department a great deal of good.

Q. How do you think that would work as applied to the Agricultural Department; the Agricultural Chemist either in the provinces or at Pusa. It has been suggested to us that difficulties might arise in this way that the Agricultural Chemist is a man who eminently requires local knowledge and whom it is necessary to associate for as long as possible with local problems, and another point is that he must also have a good general knowledge of agricultural problems generally, and be agriculturally minded as well as chemically equipped. Do you think that those objections would weigh against the other advantages of making Agricultural Chemists members of a Chemical Department in securing them for service in the Agricultural Department, in the different departments, or at Pusa?—A. I don't think so. If you had a central institution of that kind, you would also want better organisation than you have at present. A great many difficulties would be got over by having better organisation.

Q. You think that some of the present difficulties arise from inefficient organisation; that the improved organisation and co-ordination which would arise under this scheme would make up for any other losses of efficiency from the other causes I have mentioned?—A. I think so.

Q. In training men for the menial work of the department, as Kamdars, or something a little higher, men in charge of small plants, do you find that men who have had a certain amount of education are better than the men who have not had any education at all?—A. Yes, they are distinctly better. They are more intelligent and understand things very much better and also have much more influence with cultivators.

Q. You have among your menial staff a certain proportion of men who can read and write?—A. They can all read and write a little in the vernacular.

Q. It has been suggested to us, especially in Bengal, that the system of education being so largely literary, tends to increase the disposition of the Indian youth in the direction of more speculative and contemplative lines of thought; whereas it is desirable to give him a distinct bias in favour of things which are more practical. You have said something about it in your written evidence, do you think that it is worth while to try to begin the remedy in the earlier stages, *viz.*, in primary education?—A. I think so. I have said in my note that I thought that we should try to give more hand and eyetraining in the middle schools, *i. e.*, to give ordinary education a more practical turn. You can do it to a small extent in the primary school, but most of the time in primary schools is required for learning the three Rs.

Q. What is your experience in Great Britain?—A. It is altogether different there. Here, a boy, when he is to be educated, is sent away from his village to a high school where he is not in touch with practical agriculture; while in rural districts in Great Britain boys get a good education in the small board school, and work on the land at times during their school years. We learn a great deal more of practical agriculture while attending the elementary school in rural districts at home than boys in India have learned even after getting a high school education.

Q. There is no system then of anything one could call primary education in the industrial or agricultural direction in Scotland?—A. There is a great deal now. We have the teaching of nature knowledge which includes gardening among other things. The children have to cultivate their own garden plots and to grow their own little beds of plants, and they do this even when at the elementary school.

Q. How are teachers provided to give this hand and eye training in school; does it not require a very careful system to produce teachers who are competent to teach these things otherwise than by rote?—A. The teachers are very highly trained. They have to undergo courses of training in various subjects. A good many take holiday courses, others attend training classes when they are taking their university degree. They are all highly trained and have to pass examinations before they qualify.

Q. You have seen a certain amount of the attempts made to give an agricultural bias to primary education in the Central Provinces. I understand that these were more or less of a failure? Wherein do you think they failed?—A. They failed almost entirely because the teachers were not taught the method of imparting this particular kind of knowledge. They had not been taught the method of teaching.

Q. What did they try to teach in the schools?—*A.* They had their school gardens and were taught the names of plants. They were supposed to grow certain vegetables and flowering plants. The children themselves refused to do any manual labour, and the result was that the chowkidar was made to do all the work.

Q. But those things that they planted were not the kind of things they were used to in their own villages, very largely, as a rule?—*A.* They were not: English vegetables were as a rule grown in the school gardens.

Q. The masters were supposed to be trained at one time in the method of teaching nature studies in what was then the School of Agriculture at Nagpur which is now the Agricultural College. Do you think that the system of education was adequate for the purpose for which it was intended?—*A.* They were merely taught facts, not the method of teaching.

Q. As a part of their normal school course?—*A.* They took this agricultural school course after finishing their normal school course.

Q. They taught them dry facts but not that method of imparting knowledge which stimulates interest in the subject taught?—*A.* Yes.

Q. Do you know how the matter stands now; whether anything has been done about it?—*A.* The Education Department as yet have no staff trained in the method of teaching nature knowledge. They have brought out readers with lessons on agricultural subjects; lessons which it is supposed will interest children in their natural surroundings.

Q. Perhaps you remember the agricultural primer which was at one time used in the schools, and from which eventually certain lessons were put into the school readers. Those were attempts to make intelligible to village youths theories of plant growth. Do you think that is a suitable kind of thing in preliminary school education in this country?—*A.* I don't think so, because the object of the person who wrote these books evidently was to teach them mere facts, *i. e.*, to give them information about certain subjects. Children can gather that information in the village in a very short time. The great thing is to interest them in certain subjects, and our school books in use at present are not written with that object in view, as far as I can make out.

Q. You consider the functions of co-operative department important for the assisting of seed distribution, for instance, and for other purposes with reference to agriculture?—*A.* I do.

Dr. E. Hopkinson.—Q. Do you state as a definite proposition based on your own personal experience that the man who is best at research also makes the best teacher?—*A.* No, I don't believe that. What I said was that if a man was doing research work at the same time as he was teaching, that that man would be better teacher; the mere fact of his doing research makes him a better teacher.

Q. Would you hold the converse proposition, that he would do better research because he was a better teacher?—*A.* No, I don't think experience gained in teaching would make him do better research work.

President.—Q. But by bringing him in contact with students, don't you think it would colour his research work in a way that would be an advantage? Would it not make him look at research problems from the point of view of application to those students? In the course of teaching would he not get inspiration for research problems?—*A.* That is quite possible. He would get the same inspiration as he gets by studying local conditions.

Dr. E. Hopkinson.—Q. In the course of such teaching as he has to give, do you think he would get more inspiration towards research?—*A.* He would learn a certain amount from the students who had come from the villages and had had a chance of coming in contact with their parent's work, and of learning what their agricultural problems were.

Q. In your evidence you state that the "Imperial Agricultural Department should always have as its head a scientist whose work has been of great practical value in developing agriculture." That is your deliberate opinion that he should be a scientist rather than an administrator?—*A.* It is.

Q. Can you develop that any further; it is rather a strong opinion to express. Why do you consider that that should be the case?—*A.* Because I don't see why a scientist should not be as good an administrator as a man who is not. The head of a scientific department should, I hold, be a good scientist and a good administrator as well.

Q. Don't you rather mean that the head of the Agricultural Department, unless he is a scientific man, would not show sufficient interest in the scientific aspirations of the department and in scientific work?—*A.* Yes, that is so. I am only referring to the Imperial Department.

President.—Q. I suppose you also think that he would be able to discriminate in regard to the merits of the different cases?—*A.* Yes.

Q. And even to decide on the merits of scientific problems?—*A.* Yes; whether the results of any piece of research work are worth publishing or not for instance.

Dr. E. Hopkinson.—Q. So you think that a man who is distinguished merely by an administrator is not a suitable head in the Agricultural Department?—*A.* That is my opinion.

Q. To go to another point at the risk of repeating the question almost in the same form as Mr. Low asked you; you have devoted a great deal of attention to cotton growing in the Central Provinces, and you have attacked the problem entirely from the point of view of increasing the productiveness of the crop, and thereby increasing the profits of the cultivators?—*A.* Yes.

Q. Can you in approximate figures give us an idea of the success of your work?—*A.* This year we will add one crore and five lakhs of rupees to the wealth of the provinces by having introduced Roseum cotton.

Q. That would go to the cultivator?—*A.* Not all to the cultivator, for the reason that in a good many cases the buyer buys the cotton as kapas, not as lint and does not always give the price which the highlint percentage of Roseum would justify him in paying.

Q. Still that crore and five lakhs would, all in a sense, be added to the wealth of the country?—*A.* It is shared between the buyer and the grower.

Q. Not only in the country but in the province?—*A.* Yes.

President.—Q. What is that increase on last year's results, or on the old pre-Roseum days?—*A.* The increase is an annual one. One crore and five lakhs represents the increase for the year 1916-17. It is growing larger every year as the area under Roseum extends.

Q. It really amounts to one crore and five lakhs per annum, since you have introduced this on a sufficient scale?—*A.* Of course it is increasing every year. I hold that we have, by this one improvement, added in one year to the wealth of the country, a sum that would more than cover the cost of all the Agricultural Departments in India, and more than cover the cost of our own department twenty times over this year.

Dr. E. Hopkinson.—Q. There is then some hope for the future?—*A.* There is great scope for development.

Q. You have described to Mr. Low the steps taken with reference to seed. Will you tell me what the Akola seed farm is?—*A.* It is an experimental farm run by the Department of Agriculture. It comprises an area of 271 acres. The farm is divided into two parts, one experimental and the other non-experimental. In the experimental portion we carry on different experiments. In the non-experimental we incorporate the results obtained from the experimental portion.

Q. Have the provincial Government had to give any money assistance to the working?—*A.* The farm in reality costs the Government nothing as it yields a profit of from Rs. 4,000 to Rs. 5,000 every year.

Q. That is not included in the crore?—*A.* The crore is what the cultivators are supposed to make on the cultivation of Roseum in their own villages.

Q. Has any Government assistance been required in the ginning?—*A.* No supervision is required where they have their own gins. We have as seed-growers, enterprising landholders who supervise the work themselves. They now know the different varieties of indigenous and exotic cottons found in the provinces and can discriminate between one variety and another, and they have enough common sense to realise the importance of maintaining the seed pure.

Q. You have undertaken that work with regard to ginning and seed farming as part of your regular duties. Have you had to go further and give any assistance or help or advice in connection with marketing?—*A.* Not with Roseum, for the reason that buyers already pay the full market value for the lint. They do, however, take advantage of the cultivator when they purchase Roseum kapas (unginned cotton) in so far as they do not allow a sufficient margin for the very high ginning percentage given by this variety at the time of fixing the price. We are now trying to get certain buyers to guarantee to pay the full value for the kapas too. We used to grow a long stapled cotton known as Buri in Berar. By collecting all the lint of this variety for the Empress Mills we got a higher price for the grower than he could get from local buyers. We found, however, on introducing Roseum, that Buri though it fetched a higher price could not compete with this more prolific though shorter stapled variety, *viz.*, Roseum.

Q. I suppose the cotton grown in Berar and the Central Provinces is largely consumed here?—*A.* The greater part of it is exported. A very large quantity is now purchased by Japan. The area under cotton in the Central Provinces and Berar is $4\frac{3}{4}$ million acres.

Q. What is the quantity in bales?—*A.* The outturn this year will be low. We have forecasted 864 thousand. Last year it was 11 lakhs of bales.

Q. Why is it not used in Bombay?—*A.* It is used all over.

Q. The amount is so large that there is a considerable quantity left for export?—*A.* Yes. The quantity used in the province is small.

Q. You state in your evidence, "To improve the labourer's efficiency generally, we want more and better elementary education." What do you mean by the "labourer's efficiency"; do you mean that he digs better, or ploughs better, or sows better?—*A.* I think education really gives a man power in so far as it makes him more intelligent and intelligence makes him a more useful labourer.

Q. Does it stimulate aspiration to be a better labourer?—*A.* Yes, to a certain extent. Education makes him aspire to become more skilful in all his work. The added intelligence which it gives makes him more capable in the handling of agricultural machinery for instance.

Q. You really think from observation that the labourer—the agricultural labourer—does plough better and does dig better, because he can read and write?—*A.* I am arguing from general principles.

Q. That is what I want to get at, whether you were arguing from general principles or speaking from your own personal experience as applied to Indians?—*A.* The labourers in Berar and the cotton tracts are better educated than in Chhattisgarh; they do more work and better work.

Q. You think you may fairly attribute that to their better education?—*A.* I think it is partially due to that. We give a man education and it gives him a certain sense of enterprise. He becomes more anxious to save a little money in order to be able to educate his children.

Q. Do you think that teaching the ryot to read and write will justify itself economically?—*A.* I am not prepared to answer that question. I could not say to what extent it will help the country economically.

Q. You describe here in the last paragraph of the first page of your written evidence what should be the character of the teaching. In reply to Mr. Low I think you said that that had been tried in the Central Provinces, but had failed, owing to the teachers not being competent. Did you add that at Jubbulpore the experiment was being re-tried, with better-trained teachers?—*A.* They are starting to train their teachers in the method of teaching "nature knowledge". They have not in the past had teachers trained in the method of teaching this subject.

Q. Have any of them finished their training?—*A.* I know they have at least started to train them.

Q. You think that the experiment will be thoroughly carried out here in the Central Provinces and given a fair trial?—*A.* I am sure that if they don't train the teachers, nothing can be done in schools in teaching elementary science or "nature knowledge" as it is generally called.

Mr. A. Chatterton.—Q. You say, "In the Central Provinces takavi loans are given to cultivators for the purchase of improved agricultural implements" and then you say, "I am in favour of much larger amounts being given for agricultural improvements both by Government and co-operative societies and central banks." Will you tell us how these takavi loans are given out here for agricultural improvements, and on what terms?—*A.* The person who wishes to purchase a new implement, say a cane mill, costing about Rs. 140, applies at present to the Deputy Commissioner of the District for a takavi loan of Rs. 140. We endorse his application and recommend that the loan should be given. Then the Deputy Commissioner enquires into the case to ascertain to what extent the man is already in debt. If he thinks it safe to give him the loan, he gets it. The loan is to be paid back in a certain number of years in instalments.

Q. How many instalments?—*A.* I think it is three years. It varies.

Q. How long does it take to carry out this system, from the time the ryot makes application for the loan to the time when he gets the money placed at his disposal?—*A.* When the application reaches the Deputy Commissioner, he takes it up at once. He himself knows that unless the man gets the mill that season, it will be of no use to him. Suppose he applies in October, he gets it in January; there is no great delay.

Q. Are there many loans granted in this way?—*A.* Quite a number. We sold 56 cane mills in one district last year, most of which were purchased in that way. Government also started some cotton ginning plants in Berar in the same way, by giving Rs. 2,000 for the purchase of each ginning plant consisting of an oil engine and two or three gins. Quite a number of the owners of private cotton seed farms got takavi loans for this purpose.

Q. In these cases is the ryot advised as to the kind of plant to be purchased?—*A.* He only purchases plants or implements recommended by our department. We generally suggest to him both what to purchase and when to apply for a loan.

Q. Do you think that this system of coming to the aid of the agriculturalist is capable of considerable extension towards the granting not only of more loans but of much larger loans for more extensive plants?—*A.* The system can be utilized with advantage in introducing agricultural machinery of proved utility such as improved cane-mills for example. The Nahan mill which the department is introducing expresses 25 per cent. more juice than the country mill and therefore adds largely to the profit on cane cultivation. In a case of this kind, where we are absolutely certain that the cultivator can make such a handsome profit by investing in a new machine, Government is quite justified in giving takavi loans for that purpose.

Q. Have you any instances in these provinces of setting up power crushing plants on a small scale?—*A.* We set one upon one of our experimental farms. We are only testing it at present; this is its second year under trial.

Q. Is the cane cultivation sufficiently concentrated to justify establishing power mills?—*A.* In a few instances we have about 60 acres of cane in one village; that is quite large enough an area for a small plant.

Q. How would you suggest that villages like that should become possessed of power plants for crushing cane?—*A.* We might hire out a plant to the leading man of a village and allow him to crush the cane belonging to the cultivators at so much per maund.

Q. Would it be possible to do it by creating co-operative societies in the villages?—*A.* That is quite possible, and we are considering that; but we want to make absolutely certain that it is to be an economic success before we advise a co-operative society to finance the scheme.

Q. So far you have been very fortunate in getting loans without delay; do you think it would be an advantage if the Agricultural Department had authority, instead of the Revenue officers, to grant these takavi loans?—*A.* I think it would be a mistake, as we would also have to recover the loans in that case. It is much easier for the Deputy Commissioner to do that.

Q. You say at the beginning of your note that you experience considerable difficulty in regard to getting sufficiently skilled labour in the villages to repair machinery. You know the kind of students they are turning out at the Nagpur School of Handicrafts?—*A.* I have seen them.

Q. Are the blacksmiths and carpenters who are being trained there sufficiently trained for your purpose?—*A.* I think they are sufficiently trained to set up cane mills, to put ploughs together and to do repairs.

Q. Do you think that, in the development of agriculture in this province, power-driven machinery will come into use largely?—*A.* I think so, more especially in the case of the cotton tract where we have already set up several small ginning plants. If cane cultivation is to be extended, certainly it will be necessary to use powder-driven cane mills. So long as bullock-driven cane mills only are used there will be no scope for extending cane cultivation; for the reason that the man who has, under existing conditions, both to plant and crush his crop cannot find sufficient labour to deal with anything but comparatively small areas.

Q. In discussing the question of these cotton seed farms, you said that seed unions were provided with gins for extracting the seed. Are they power-driven?—*A.* Yes, they are driven by small oil engines.

Q. Who provided the capital for these; was that lent by Government?—*A.* In most cases it was lent by Government, but in one case they got the money from a co-operative bank. The members of the union belong to a credit society in the village, and were therefore able to borrow from this central bank.

Q. But in the other cases the small ginning factories belong to individuals?—*A.* Yes. The man who owns the ginning plant, gins cotton for the other members of his union, and charges them so much per khandi.

Q. Do you supply any machinery or implements direct from the department on the hire purchase system?—*A.* We have not supplied any on the hire purchase system; we sell direct from our depôts.

Q. Have you depôts scattered about the province for the sale of manure?—*A.* We have nitrate of soda stocked on our Government farm at Akola. In villages where cane cultivation is being done on the improved lines, recommended by our department, we supply cake direct from the oil-mills for any cultivator who may want to apply it as a top-dressing to this crop. We don't store it as a rule but bring it direct from the mills and hand it over to the purchaser.

Q. Do they pay cash for it, or do you execute a bond?—*A.* In most cases they get takavi loans which we recover in instalments. They pay the money to the Deputy Commissioner.

Mr. F. J. Plymen.

Q. Is the takavi loan for one year or spread over several years?—*A.* I think it is for three years as a rule for implements, and for one year in the case of cake. The money is recovered by the Deputy Commissioner; we have nothing to do with that.

Q. You don't think it would become more popular if you were to administer the distribution of the loans even if the Revenue Department had to collect them?—*A.* I don't think so. We find the Revenue authorities always ready to help us, and do whatever we suggest. We are in close touch with the Deputy Commissioners, and always get them to do what we want.

President.—Q. Do you think that the work of the department has yet made any appreciable difference in the economic condition of the people of the province?—*A.* I have already pointed out that we have certainly increased the wealth of the province. People are taking a very much more intelligent interest in our work now. At our agricultural meetings we have people coming forward who talk intelligently, and at length, regarding the different improvements we have introduced. They now discriminate between the different varieties of cotton found in the provinces for instance, and talk learnedly at our meetings of the manures, new methods of cultivation, etc., which they have tried on our recommendation. They are undoubtedly taking a more intelligent interest in agricultural development.

Q. You are seeing the result of the spread of a form of agricultural education among them; they are actually beginning to look at things in a different light?—*A.* I think so. They also now read our Agricultural Gazette of which about 6,000 copies are distributed every month.

Mr. C. E. Low.—Q. What scope do you think there would be for the introduction of artificial manures on a very large economic scale, especially artificial manures such as might be produced in the country; I allude particularly to sulphate of ammonia?—*A.* I think there would be a great demand for sulphate of ammonia, if we could get it at a reasonable price, but present prices are very high.

Q. Say pre-war prices, £ 15 per ton?—*A.* Sulphate of ammonia we generally buy at Rs. 15 per cwt. If they could reduce it to about Rs. 10, it would be a practical proposition.

Q. What about nitrate of soda for the cotton fields?—*A.* Even at a high price it gives excellent profits; that is when you use it to supplement cattle dung.

Q. What about basic slag?—*A.* We have tried basic slag, which we got from Tata's works at Kalimati. It increased the outturn of the cane, but the cost of freight is very high and this reduces the net profit.

Q. Did you get an analysis of it?—*A.* Yes, we got an analysis.

Q. You are probably aware that it is much lower in useful phosphates than British basic slag?—*A.* About 7 per cent.

President.—Q. Does it contain any appreciable quantity of lime of any value?—*A.* It is rich in lime but lime is not required for our soil.

Q. Do you find that the soil here responds in any way to potash?—*A.* Very little to potash; it responds to nitrates and superphosphates.

Q. That seems to be general all over India, except in ten districts?—*A.* We have been applying phosphates as a cane manure; it answered very well last year.

Mr. C. E. Low.—Q. What do you think of bone meal manure; do you think there is any demand for that?—*A.* We find great difficulty in getting cultivators to use bone meal as a manure, on account of the prejudice against the use of bovine bones.

Q. You had some experience of bone meal in Chhattisgarh. The Government laid down a lot of machinery for making bone meal, and afterwards got a small mill-owner to take it up himself. Did you create any general demand for it?—*A.* There is no general demand. We sell bone meal mostly to Europeans for gardens; but very few of the cultivators ever apply it as a manure.

Q. Do you think they would be less prejudiced against bones in the form of superphosphates?—*A.* If they did not know what the manure was derived from, there would be no objection to it.

WITNESS NO. 149.

Mr. F. J. Plymen, A.G.G I., Agricultural Chemist, Central Provinces and Berar.

Written Evidence.

Technical aid to industries.

Q. 15—Analyses of raw materials and of mill products are frequently carried out in my laboratory for the proprietors of oil mills working in these provinces to assist the managers in their control.

At present these analyses are done free of charge.

Q. 21.—I believe the scientific and technical department of the Imperial Institute to be of considerable value. It is a means whereby the Indian producer can get into touch with the home manufacturer and consumer. It is also of great use in collecting information on industrial products from all parts of the world.

Research abroad.

Qs. 22 & 23.—So long as scientific attainment in the United Kingdom is so much higher and wider than it is in India it appears to me to be a great advantage to have research on special subjects occasionally carried out there. To confine research on Indian subjects to India would be to cut off one of the main sources of valuable assistance unless the scientific staffs in India are made exceedingly complete.

It is difficult to define the exact subjects which should be investigated in England rather than in India but occasions will probably arise when the equipment and knowledge in India will be found insufficient to elucidate some intricate problems.

Q. 24.—For co-ordinating and controlling the work of scientific departments as a whole the present Board of Scientific Advice might be extended into an Advisory Council. This council might form a number of authoritative sub-committees each to deal with some particular branch such as (a) agriculture, (b) forestry, (c) industries, etc.

Q. 63.—At present the Departments of Agriculture and Industries are under one head, the Director of Agriculture and Industries. I recommend that these two posts be divided as the work is too much for one man, and a separate Director of Industries be appointed. Both these appointments should be for a much longer period than has been customary in the past in the case of the Director of Agriculture.

Technical and scientific departments.

For these provinces the type of man required for Director of Industries is not an expert in one particular industry, as most of the local industries are only just developing. The Director of Industries should be a man with a general knowledge of industrial processes and engineering problems, a sound business capacity, and a good local knowledge of the Central Provinces and Berar and their industrial products.

All appointments of an industrial nature, whether educational or advisory, should be under the Director of Industries.

Qs. 64 to 67.—In order to aid industrial development it is necessary to have a staff of experts in the main industries of the country. These might be formed into an Imperial industrial service or department, and the following branches of industry might each have its own expert—metallurgy, oils, fat and soap, glass and pottery, fibres and cellulose with others as need arises. These men would work at a Central Institute under a head who would be the Director-General of Industries directly responsible to the Imperial Government. The latter would regulate the work of the experts and control the relationship between them and provincial Directors of Industries. The experts would be deputed to work in any special provincial investigation under the orders of the provincial Director of Industries. The Director-General of Industries would criticise any scheme put forward by a provincial Director, and decide whether the scheme were worth the attention of the expert and also the order in which various investigations should be taken up.

Imperial departments.

These industrial experts should be men each with a long and thorough training in his own particular industry, and the salary offered should be sufficient to attract the very best men. In view of the length of experience required, young men would not be suitable for these posts, so a high initial salary would have to be offered.

So long as the proposed central industrial institute did not become so large as to be unwieldy it would be a great advantage to have all the experts working at one central place, preferably Calcutta. The advantages of mutual advice and criticism thereby obtained would be considerable in addition to the advantages of a university library, laboratories, etc.

Qs. 68 & 69.—With experts in the main industries provided by the Imperial Government, provincial Governments would only engage instructors for industrial schools, cottage industries and the like, and these men should be placed under the control of the Director of Industries.

Provincial departments.

Q. 71.—For the training of the staffs required in each branch of the proposed industrial institute the instruction given in the laboratories of the Indian Institute of Science would probably be very suitable. Such institutions should also supply the men who will eventually be required by various industrial concerns.

Technological institutions.

Q. 74.—The Agricultural Department is a scientific department including both Imperial and provincial branches. So far I have not found any marked overlapping of work between that carried on by the Imperial Department at Pusa and that of the various provincial departments. The Imperial department deals with more general questions which provincial departments, for one reason or another, are not in a position to undertake. The provincial departments deal with local questions, and the two departments are both essential and mutually support each other.

Co-ordination of research.

Local agricultural problems could not well be worked out at Pusa. Agricultural demonstration in the provinces is the application of well established agricultural principles to the conditions of local agriculture, and in the past the principles which have been applied have been those of other countries or adjacent tracts. For further improvement more and more local research will be necessary, the value of which will be apparent as the standard of local agriculture improves.

At present there is a greater probability of overlapping between the different branches of a provincial department than between a provincial and an Imperial department, and it will be necessary, as work and workers in provincial departments increase, to check this tendency. For this purpose I recommend a committee consisting of all the senior officers of a provincial department, which should meet at least every year, to discuss the programme of experimental work, and the results obtained in the past. By this means not only would every officer know the work contemplated in each section of departmental activities and who was responsible for it, but also in what line of work his assistance would be of value. Every piece of work undertaken would then be done with the approval of the whole local department, and suggestions could be made for improving or extending the scheme of any particular piece of work. In this way each provincial officer would feel that the work he was engaged upon had the approval and support of the entire provincial department, and that he was not working in his own water-tight compartment with possibly another officer in the same department working independently along similar lines.

Reference libraries. Qs. 78 & 79.—The second class scientific library maintained in the Victoria Technical Institute is sufficiently complete for general purposes. It would be impossible to have very full libraries at every centre where a few scientific workers happen to be found, and for purposes of reference it would be better to have really big complete libraries at a few centres in India from which, under suitable rules, books could be borrowed. Facilities could also be given for workers from outside centres to visit the consulting libraries when a large number of references had to be made.

Prevention of adulteration. Qs. 91 & 92.—A strong endeavour should be made to prevent the adulteration of food-stuffs in particular milk, butter, ghee, oils, sugar, etc. It would be difficult at present to take the necessary measures all over India, but a beginning might be made with large municipalities. Health officers or officers of the medical and executive services might be empowered to take samples for analysis, and the various provincial agricultural chemists might be appointed analysts under a Food Control Act. Offenders would be prosecuted by the local executive officers on the analyst's certificate. The placing of food control in the hands of the Agricultural Department has for precedent the system followed in the United States.

Hydro-electric power surveys. Q. 102.—The possibilities of developing hydro-electric power in these provinces should be investigated. If such power were obtained it would be of great value to agriculture in providing cheaper nitrogenous fertilisers made from the atmosphere, apart from its value to other branches of chemical industry, as for example the manufacture of aluminium from bauxite.

General. Qs. 111 to 113.—The following industries appear to me to be particularly deserving of investigation in these provinces:—

(a) The hardening of vegetable oils.

(b) The suitability of various local raw materials for paper pulp.

Other industrial processes might be worth attention if heavy chemicals were available at cheaper rates, and I consider the foundation of works for the production of such chemicals to be a preliminary requisite for most other industries.

Oral Evidence, 18th December 1916.

President.—Q. In answer to question 71 you say that for the training of the staffs required in each branch of the proposed industrial institute the instruction given in the laboratories of the Indian Institute of Science would be very suitable. There is no instruction given so far as I know except in electrical engineering. What was your impression?—A. Even if no teaching is actually given there at present, I think the Tata Institute could be made a suitable institute for training the kind of men required.

Q. Have you made any use yourself of the scientific and technical departments of the Imperial Institute?—A. I once wrote to them on a particular question and they replied that they would help me if I sent them samples. That was the only occasion. This agency is useful in bringing one into touch with the home buyer.

Q. Suppose that we had a Trade Commissioner in London representing Indian trade interests and that he had attached to him one member of the Agricultural Department and one member of the Forest Department and one member of the Geological Survey, these scientific specialists being men of not less than 10 years' service and not more than 20 years' service, and being senior enough to know the conditions of India and junior enough to

pick up tips at home in order to apply them to Indian conditions. Suppose that these men were attached to the Trade Commissioner for a period of two years and possibly for three years in order that he may not lose touch with Indian conditions and that he may not settle down at home. Do you think that a system of that kind would suit your case in passing on problems that you could not deal with here?—A. I think such an arrangement would replace that branch of the Imperial Institute's activities most effectually and with more efficiency than can be expected at present.

Q. The one difficulty about the Imperial Institute is that its officers have no Indian experience. Suppose that anybody in London got information which he thought was worth following up; if he went to the Imperial Institute, the utmost they can do for him is to write to India to get the information. But are there not problems of a kind that specialists with recent knowledge of India could hammer out on the spot in consultation with the technical officers and the commercial people in London?—A. I think there certainly might be. The difficulty in bringing together the scientific investigator in this country and the home buyer is very considerable and anything done to improve present conditions would be an advantage.

Q. Cases are known to me where people in London, who wanted to take up a proposition in India and develop it, went to the India Office and were told that they would get the information available as quickly as possible. But delay was involved and the person is losing in the meanwhile. The information given may not be the information wanted. If there was some one on the spot who could put the man in touch with the right kind of official the man could follow up the problem at once. A scheme of that kind would be of real benefit to the country?—A. I would not do away with the Imperial Institute but I think it would be a great advantage for India if it could be replaced by something more complete. It is not complete at present.

Q. There are problems here that you cannot take up in this country, not because they could not theoretically be taken up, but because you are engaged in other things and too busy with other questions, the day-to-day problems. But there are some cases, such as that of rare earth, which your laboratory cannot deal with. Such problems occur in the Central Provinces, in Madras and in other parts of India, and in Australia and the Crown Colonies. It might be possible to gather these together at some central institution and feed that institution with a continuous series of such problems. Does that appeal to you?—A. Probably the central industrial institute which I have proposed might answer the purpose but if the problem is too complex to be handled here it might be sent to somebody at home.

Q. In your central imperial industrial service you lump together a lot of things that are unrelated. Do you expect all of these to be taken up in one department?—A. I expect each of these industries to have its own head with a separate department but all of them should be under the control of one officer. I term him Director-General of Industries.

Q. There might be room for him and several others of similar rank. The Director-General might gather together the questions connected with glass and pottery. But in the case of fibres, for example, you have not only the physical and chemical problems but also the marketing conditions and the conditions of growth. In the case of oils too, you have quite a number of complicated problems. So that you would only have the Director-General of Industries to apply the results of these specialists?—A. I rather think that the application of the work of the specialist would lie with the provincial directors because the work would have to be applied in the provinces.

Q. There are likely to be clashes of interest, for example between an inland province and a coast province. The coast province looks for export and the inland province for consumption. The Director-General of Industries would bring these different interests into correlation?—A. I should give the Director-General the final veto. His would be the last word as to the order in which the subjects would be taken up.

Q. Do you want him to be the actual senior of so many specialists or would you think it suitable for him to be in charge of what we might call industrial intelligence?—A. The institute would be sufficiently big to have a separate man in charge of the administrative side of the whole work.

Q. There are quite a number of chemical problems in the country, such as chemistry of agriculture, of oils, of fats, of glass and fibres and so on. All these amount to an enormous number of activities in the mining world alone. Do you think there will be justification for the organisation of a Central Imperial Department with a Chief Chemist to the Government of India and appropriate sub-divisions to deal with the different branches?—A. I certainly think it would be an advantage to have all the branches taken under one service. The branches would remain independent of one another.

Q. That would follow as a matter of ordinary administration. Do you think there is any advantage in forming such an imperial service with a view to creating a chemical *esprit de corps*, that a man is a member of the Chemical Department of the Government

of India, qualified for the different post of Deputy Chemists and so on and with a prospect of being selected as the Chief Chemist not only a qualified chemist but also an administrator and a man of the world?—A. I think there would be an advantage in having all these different branches of industrial chemistry brought under one head.

Q. Knowing what you do of the organisation of the Agricultural Department would you prefer that the agricultural chemists should be members of this Chemical Department and their services lent to the Agricultural Department—either to the Provincial Agricultural Departments or to the head-quarters at Pusa—or would you prefer that the agricultural chemists should be ordinary members of the Agricultural Department as you understand it now?—A. The agricultural industry is likely to be the biggest industry in India for many years to come and therefore I think it is almost big enough to be self contained. It certainly wants provincial men. But as the provincial man wants assistance in certain subjects frequently it would be an advantage to have a supplementary service which could be called upon for special investigations. These men might be retained at some central institute. It scarcely matters whether he belongs to the agricultural service or to the chemical service. It is essential that he should be attached to a province for a very long time. The longer the better, even if it amounts to the whole of his service.

Q. Which now would you prefer on the whole, that the Agricultural Department should have a service of chemists of its own, or should the agricultural chemists be a part of the greater department, the Chemical Department of the Government of India?—A. It is rather difficult to say. I have been ten years in the agricultural service and I am rather biased towards it. If a man comes out fresh to the country knowing nothing of the agricultural or the chemical service I should like him to belong purely to a chemical service but having once been attached to the agricultural service I think the ordinary agricultural chemist will find that his own province is big enough and full enough to employ him for the rest of his service and he would probably not want to go to any other province.

Q. Would he not be jealous of the man who became Chief Chemist?—A. In my case I would not be jealous of the man who became the chemist at Pusa. I think the pecuniary advantages of going to Pusa do not balance losses in other ways that one might suffer. Pusa has a life of its own and one who has been in a provincial department might not like to go to Pusa.

Q. If Pusa had been composed of the cream of the department would you not like to be one among that cream?—A. Professionally, yes! One should aim at going to Pusa.

Q. The present democratic system does not appeal to me. If you had a chemical department you would have nothing to do with vegetable dyes and paper pulp and things of that kind and that would relieve you for the work of your department?—A. I relieved myself of the vegetable dyes sometime ago. As regards paper pulp I want expert advice. I want a department that will take it up.

Dr. E. Hopkinson.—Q. How do you make yourself acquainted with the work of agricultural chemical research going on in other provinces?—A. We have a library here which receives periodicals and journals showing what is done in other provinces.

Q. How in the case of prospective work?—A. We cannot do that.

Q. You have then no means of knowing what is going on elsewhere in India?—A. We only know by the programmes of work published from time to time at the meetings of the Board of Agriculture.

Q. Are these meetings at long intervals?—A. They vary. We had them yearly for a time and some people thought it was rather a waste of time.

Mr. C. E. Low.—Q. How long does it take you to go to Pusa from Nagpur?—A. It takes four days to and fro and seven days for the Board meeting itself, that is 11 days in all.

Q. Do you consider that the time is well spent?—A. Well spent for a chemist who is doing that type of work with which the Board deals.

Dr. E. Hopkinson.—Q. You have very little opportunity of associating with other agricultural chemists?—A. We meet once in two years. Sometimes once a year. I occasionally go away to other agricultural centres when I get a chance of seeing people.

Q. Do you consider such isolation a drawback?—A. I consider it a great drawback.

Q. Do you consider you have work before you of unlimited scope. Are there many unsolved problems to engage you?—A. Any amount of them. I have sufficient problems before me now to keep me going till the end of my service.

Hon'ble Sir R. N. Mookerjee.—Q. In answer to question 63 you say that the Director of Industries should be a man with a general knowledge of industrial processes and engineering problems, a sound business capacity and a good local knowledge of the Central

Provinces and Berar. Do you think that such a man is available?—A. I am afraid that is rather the ideal. If we cannot get a man with all these qualifications let us get a man with as many of them as possible.

Mr. C. E. Low.—Q. In answer to question 111-113 you say that certain industries appear to be particularly deserving of investigation in the provinces and you suggest the hardening of vegetable oils. Would that be a matter for investigation and research or for starting an experimental factory?—A. I use the word investigation there to cover not only the actual experimental work of hardening but also investigation of the commercial possibilities. The question of marketing the product is a very important one.

Q. You mean manufacture on a commercial scale?—A. Yes. I had correspondence on the subject with one or two firms. They said that they were prepared to take up the question of hardening of vegetable oils on a commercial scale in India after the war.

Q. You say that there is likely to be far more overlapping between the different branches of provincial departments than between an Imperial department and a provincial department. Do you consider that the present arrangements of the Agricultural Board and the Board of Scientific Advice affords sufficient means of preventing that?—A. I consider that there should be much more thorough investigation of the programme of the work of a department before the work is undertaken. To take an instance a man may take up a particular question and work at it for, say, two or even three years and then the scientific people at Pusa may approve of the work or they may condemn it. The proper time to investigate the scheme of a line of work is at the start and not at the end. I do not say that work has actually been condemned but it may happen.

Q. Do you consider that some other agency is required for the purpose?—A. Instead of the Pusa Board which is criticising the work of any provincial officer, I think the work of a chemist should be criticised by chemists and the work of a botanist should be criticised by the senior botanists in the service. If a man sends up a monograph it might be easily criticised by these people and they might send it back to him. What I say would apply not only to the outline of the work to be done but also to the work when it is finished.

Q. Supposing the agricultural service were kept outside this general scheme for a chemical service, do you think there is a certain amount of help that might be got in the matter by some co-ordination of the chemical branch of the agricultural service with the general chemical service?—A. I think that if there were a number of chemists outside the chemical service then a man in the agricultural service knowing of the existence of these men would go to them himself for any advice on any particular line of work. I think the actual editing of an agricultural chemist's work should be left to the agricultural chemists. Of course if the agricultural chemists had as their head a man of outstanding ability and seniority it would be a great advantage.

President.—Q. Do you mean to say that there should be a similar head under the Government of India?—A. I mean that the head of a section of the Agricultural Institute at Pusa should be a man of outstanding reputation and a man to whom any one could go and whose opinion would be valued.

Q. He would also have five other little Popes?—A. He would be the only Pope.

Q. He would not be a Pope in chemistry and also in bacteriology?—A. For example take botanical work. The head of the section at Pusa would be the head of the whole of the agricultural botanical work in India and his criticism on any botanical work in India would have very considerable weight indeed. He would have the last word on any botanical subject.

Q. But not also in agricultural chemistry?—A. You might put the Deputy Director General of Agricultural Chemistry as the head of the agricultural chemistry branch at Pusa.

Q. Where would he be?—A. He would be the head of all the agricultural chemists in India.

Q. The head of the mineralogical branch would be at Calcutta, of the organic chemical branch at Cawnpore and so on?—A. I should like to have these as much at one centre as possible. It would be an advantage to have an industrial institution centered in Calcutta. I should not have a cotton institute situated at Calcutta. But an institute for general industrial purposes should be as much centralised as possible.

Q. This scheme of an imperial chemical department contemplates the existence of anything between half a dozen and twenty big institutes, one dealing with agriculture at Pusa, one dealing with the mineralogical part in Calcutta, one dealing with the metallurgical part somewhere near the Tata Works which would become the centre of the metallurgical area. In that way there will be a dozen institutes about the country in their proper place, all controlled by the Chief Chemist with the Government of India. Each Deputy Chief Chemist will have his own laboratories and his own staff round him?—A. I take it that the Deputy Chemist would as a rule be where the institution is. In my proposition I tried to combine all these activities at one centre for the time being.

Mr. E. R. Powell.

Mr. C. E. Low.--Q. I should like to take up the same matter that the President was dealing with but from a slightly different point of view. Do you think there ought to be an industrial service or a chemical service leaving out again the question of the Agricultural Department?—*A.* In the Industrial Department the chemists would not be at all sufficient. You will want a number of engineers, you will want textile men and so on. Then you have to bring in also your factory engineer. I think that unless the scheme became too big to come under one industrial service, the latter would be the best plan.

Q. Is the connection between the work, say, of an agricultural chemist and an agricultural botanist more intimate than that between the work of an engineer and a chemist in an industrial department?—*A.* I should think they are of the same degree of intimacy.

Q. Does an industrial chemist require to have the same knowledge of the possibilities of a trade from the point of view of industries as an agricultural chemist has to do of agriculture?—*A.* I do not think the industrial chemist would necessarily know much of the possibilities. He is rather concerned with the raw products and working them up.

President.--Q. I suppose it might follow that when a stage is reached when the Imperial Chemical Department might be usefully split into so many independent units, that might be done. For example a large number of textile experts employed by the Industrial Department might form a separate service?—*A.* I think it would be an advantage for the textile work. As soon as any department became big enough it might be made a separate independent unit. I would not advocate a number of small departments.

Q. They could not be smaller than some of the present imperial departments which consist of two men and three men. I do not know how many officers there are in the Zoological Survey. In the Botanical Survey there is one man with two assistants?—*A.* No answer).

Q. Have you got any further suggestion to make by way of supplementing your note?—*A.* No.

WITNESS NO. 150.

Mr. E. R. Powell, Senior Inspector of Factories and Steam Boilers, Central Provinces and Berar.

Written Evidence.

Mechanical engineers.

There is a serious want of uniformity in the standard of examinations for mechanical engineers held by different Boards in India where engineers in charge of prime movers are required to be certificated. The difficulties under the present conditions, as experienced by this Province, are as follows :—

2. (1) Bombay has so far steadily refused to accept the certificates granted by the Central Provinces Board, although other provinces have had no difficulty in recognizing them.

Reasons.

3. Under the Bombay Boiler Inspection Act no Inspector shall be a member of the Board of Examiners appointed under the said Act. The objection to an unbiassed person would seem unreasonable when it is considered that all the Inspectors are Board of Trade Engineers with long and varied experience. (*Witness here gave confidential evidence.*)

4. In the Punjab, it seems that, where necessary, a member of the Board of Examiners is in the first place granted a certificate of competency of the first class under their Act in order to legalize his appointment. This may seem good enough for the purpose of examination, but certainly not for the requirements of the Act where qualified and experienced engineers are necessary.

5. In course of their duties, Boiler Inspectors are in a better position to know the requirements regarding the examination of mechanical engineers, and irregularities, if any, can be easily detected through their agency. For instance, I brought to the notice of the Board two cases where testimonials granted by an oil mill and a distillery were not accepted by the Board as qualifying service, since they had no facilities for the repairs of their engines and boilers. This resulted in certain factories being recognised under the Act.

In two other cases the production of false testimonials before the Board came to my notice and was reported accordingly. In one case the person was criminally prosecuted and his certificate of competency cancelled by the Local Administration, and in the other, the benefit of the doubt was given to the parties concerned.

6. Bombay, in the first place, I believe, objected to my appointment, as Senior Inspector of Steam Boilers and Factories, as a member of the Board of Examiners under the Central Provinces Boiler Inspection Act. In consequence, rather than be an obstacle to the province, I made room for another Examiner, although I, being a first class Board of Trade Engineer, saw no reason for doing so. A further objection was then raised to the effect that the Bombay Government was not satisfied that the Central Provinces Board was as competent as that of Bombay. This feeling seems groundless, for while there are to our knowledge no cases of candidates failing in Bombay and passing in the Central Provinces, we have on record 14 candidates who, shortly after failing at Nagpur, appeared before the Bombay Board. All of them being the inhabitants of the Central Provinces and Berar, had no reason to do so but to try the Bombay Board. After passing the Bombay examination they returned to this province and subsequently appeared before the Central Provinces Board with a smile for the exchange of their Bombay certificates.

7. In one case we had a candidate who appeared three times in succession before the Board of Examiners for the first class certificate of competency and failed each time. He subsequently appeared before the Cawnpore Board only a month after his last failure here and passed at the first sitting. The Cawnpore Board is recognized by Bombay as well as this province—as such he had his certificate exchanged by both the Boards. The above, I think, is a clear indication of what is urgently needed to bring about some uniformity in the standard of examination throughout India.

8. (II) To ensure the above, some stringent measures should be adopted to make the examination tests uniform, which may be based on the following principles :—

(a) A member of the Board should ordinarily be a Board of Trade Engineer, but where such qualifications are not available, an engineer with long and varied experience should be selected.

(b) *Text-book.*—The point regarding the method of setting test papers is also worthy of some careful consideration. Many of the examiners are in the habit of using a number of books while selecting questions for the 1st and 2nd class certificates of competency examination in place of restricting themselves to Reid's Engineer's Hand Book, which is universally accepted by the Board of Trade—the highest authority in the United Kingdom. In the circumstances the examinations of engineers are almost identical throughout the British Possessions. To me the object of the examination is to ascertain whether a candidate has a fair knowledge of the working and management of engines and boilers, together with their repairs. Reid's Hand Book is usually revised every year and in consequence is an up-to-date text-book. It is to my knowledge the only book translated in the vernacular and as such very useful for vernacular candidates. It should therefore be standardized for the purpose of examination under the various Boilers Acts, so that, like marine engineers, candidates for mechanical engineers' examination may go up with a certain amount of confidence of passing the test. It is probable that some objection may be raised against this proposal; but it should be borne in mind that theory is not all that is required of the candidate, for reason that the practical test in the oral examination finally decides whether the candidate is really fit to be an engineer of a certain class. Further, the class of men that appear for the examination under the Boilers Act is not, as a rule, well educated, and, besides, can ill-afford to purchase a number of text-books for the purpose of examination.

While, on the point of examination, I may be permitted to bring to the notice of the Commission that vernacular examination is most essential in this country for reason that although a candidate may know English, he would, in some cases, prefer being examined in his vernacular, whereby he could, with some confidence, express his views more correctly. Secondly, the want of English language should not, in my opinion, affect the technical knowledge of an engineer. On the other hand if the vernacular examination be stopped, the tendency would be to promote the theoretical than practical man.

(c) Technical institutes in India should all be recognized for the purpose of examination under the Act provided they offer the students the necessary facilities for being constantly instructed in the management of engines and boilers. The above should be decided by a Board of Trade Engineer or a committee of local technical experts conversant with the working and management of engines and boilers.

(d) The training and period of service required for a candidate of each class should be revised where necessary and standardized throughout.

(e) Like the Indian Factories Act, there should be an Indian Boilers Act based on the Board of Trade Rules, as in the case of Bombay and Central

Provinces. If this is not possible at this stage, the rules for the examination of engineers should be framed on the above basis and the certificates so granted recognized throughout India.

In conclusion, I am of opinion that an annual conference of the members of the Board, as also Inspectors of Steam Boilers, be held in turn in different centres of India for the purpose of discussions on various points regarding difficulties and experience under the Boilers Act.

Oral Evidence, 18th December 1916.

President.—Q. You say in paragraph 6 of your note that a further objection was raised to the effect that the Bombay Government was not satisfied that the Central Provinces Board was as competent as that of Bombay and that this feeling seems groundless for while there is to your knowledge no case of candidates failing in Bombay and passing in Central Provinces you have on record 14 candidates who failed in the Central Provinces and passed in Bombay after their failure. This does not necessarily illustrate your point. Would it not be due to the fact that the Central Provinces certificate does not carry the candidate beyond Central Provinces and consequently Bombay men would not sit for it?—*A.* This is quite possible under the present conditions.

Q. The evidence given is so far as it goes positive evidence but the negative evidence is not of equal value?—*A.* Perhaps Bombay may be able to give negative evidence.

Q. You don't get the Bombay man who fails?—*A.* No. We have no record of these failures.

Q. We were told by the Chief Inspector of Factories, Bengal, that there was no necessity to have a standard examination. He did not think matters could be improved by having a standard test for engineers. Do you agree with that opinion?—*A.* I am of opinion that every engineer should be duly qualified by a Board and that he should pass certain tests.

Q. The Chief Inspector of Factories in Bengal said that it would be just as well if the whole of the qualifications were abolished. He did not want a standard examination for Bengal. He said that they had no trouble with their present system and there was nothing to improve upon. Do you agree?—*A.* I do not agree. I think that boilers inspected under the Act should be in charge of duly qualified men to look after their management and safety. Otherwise the inspection of such boilers would not be of much value.

Mr. A. Chatterton.—Q. There are a number of small ginning plants run by oil engines. Do these come under your inspection?—*A.* No. I do not think an oil engine requires any supervision under the Act. There is not much danger in connection with an oil engine; but gas engines require supervision. They are very few at present in the province. They should have some sort of supervision when they increase in number. There is nothing to explode in the case of an oil engine as there is no reserved energy which could cause destruction afterwards.

Q. In a gas plant there is no reserve energy that could be suddenly liberated and the danger from poisonous gas is practically negligible because they are practically worked in the open?—*A.* They are kept in very well ventilated places.

Q. Can you tell me what pay these third class certificated engineers get in this part of the world?—*A.* They get from Rs. 50 to Rs. 75. The majority of the men in the province are third class certificated men.

Q. Is there no development here of oil engines in the small ginning factory?—*A.* Probably there is.

Q. Does the number of persons in the factory influence the matter at all? Do you have jurisdiction over a factory which has only six persons?—*A.* No. The Act is not applicable to factories employing less than 50 persons on any one day of the year.

Q. Are the boilers required to be inspected once a year?—*A.* Yes.

Q. In a factory which contains 20 persons is it necessary for the boiler to be in charge of a certificated engineer?—*A.* Every boiler working under the provisions of the Act must be in charge of a qualified engineer irrespective of the number of persons employed in the factory.

Dr. E. Hopkinson.—Q. Do you inspect steam pipes?—*A.* Yes. They are inspected under the provisions of the Act at the time of the boiler inspection.

Q. Do you also see that a proper safety valve is provided for sizing cylinders, and so on?—A. That is not provided for under the Act.

Q. Do you think the Act should be extended to such cases?—A. I don't think so. From my experience of many years there was only one accident in such cases and then only where a foreman of an iron works tried to caulk a seam of the sizing cylinder under steam pressure and so paid the penalty by being fatally injured.

Mr. C. E. Low.—Q. Is it not the case that these second and third class engineers move about freely from one province to another?—A. There is a good deal of that done; but Central Provinces engineers generally restrict themselves to this province, while Bombay engineers migrate to Central Provinces during the cotton season and return back thereafter.

Q. What would be roughly their number in the Central Provinces?—A. About 300.

Q. The majority of these are employed only during the ginning season?—A. The majority of them.

Q. I suppose the object of Bombay is that being a very large province they do not mind much whether their certificates are accepted; whereas you being a small province attach to it much more importance?—A. If we don't recognise Bombay I think this province will be handicapped. (*Witness here gave confidential evidence.*)

Q. Some witnesses said that the vernacular examination for these third class engineers is unsatisfactory and that they should have sufficient knowledge of English. What is your opinion?—A. I should not accept that by any means. Most of the third class engineers are really practical men, knowing only their mother tongue.

Q. What proportion of the third class engineers know English?—A. I should say that their percentage is very poor.

WITNESS NO. 151.

Mr. A. Green.

Mr. A. Green, Superintendent of Workshops, Government Engineering School, Nagpur, Central Provinces.

Written evidence.

Q. 44.—(a) I think that the lack of primary education hinders industrial development. Training of labour and supervision.

Q. 46.—I have had experience with the apprentice system when I was assistant manager with Claud Hamilton, Ltd., Electrical and Motor Engineers, Aberdeen, and manager of the same firm's branch at Ayr, also at Government Engineering School, Nagpur.

Q. 47.—I have observed that boys who had no chance whatsoever of learning a trade, etc., have had such opportunity at industrial schools; also they have many more advantages by being able to go through the different departments, while otherwise, had they been with a commercial firm, they would in most cases have been confined to one or two departments.

Q. 49.—I have found at home that night schools were very beneficial to apprentices in assisting their education and work, and most employers encouraged their apprentices to attend the night schools by paying their fees and, if they passed the session examination, an amount equivalent to the fees was given to the apprentices as a prize.

Q. 50.—In my opinion all industrial and technical schools should be under the Department of Industries, as the students are being trained for furthering industry. The head of these schools should know something of the work he is training his students for, and should be, as much as possible, in contact with the neighbouring factories, workshops, etc., in the provinces, and should have facilities to enable him to visit these places with the students, for the purpose of furthering their knowledge and giving them some idea of the work required of them later. I would suggest more outside work should be done in the workshops of these schools, as it gives the students a much greater variety of work, which otherwise would be too expensive. I find that the students or apprentices take much more interest in their practical training when they know that they are doing something useful and, by doing so, are doing something to pay their scholarships.

Q. 54.—All certificates for mechanical engineers should be the standard for all provinces and should be accepted in the whole of India, no matter in what province taken; but the examination should be practical as well as theoretical, as I have found during my short time in India a few 2nd class engineers are incapable of executing any repairing work, as they have never been trained to do so.

All sea-going engineers at home have to serve an apprenticeship in some ship-building yard or engineering shop from 3 to 5 years, and must have 12 to 18 months' sea experience before they are allowed to sit for their examination. Their certificates stand good anywhere, no matter at what town they sat for their examination.

Oral Evidence, 18th December 1916.

President.—*Q.* Does not the engineering work in your school, to some extent, overlap that done in the School of Handicrafts? Your men would have to be engaged in elementary courses before going on to engineering?—*A.* They have got to be trained. They get six months pattern-making, then six months moulding; then six months blacksmithing, and the remainder of the time in turning and machine work, and fitting.

Q. Your men are senior to those taken in the School of Handicrafts, and better educated?—*A.* Of a superior education to those of the School of Handicrafts.

Q. Then this practical training is just sufficient for them to become efficient engineers?—*A.* Yes.

Q. You say in your note that you think a good deal of outside work can be taken into the school, of the kind you have got. If that was put into effect in any very material degree, would that not interfere with the carrying out of any systematic curriculum?—*A.* No, I don't think so. At present it is very hard to teach engineering unless you get outside work to do. You can teach them small jobs, like bolts and nuts, but you must have outside work, otherwise when he leaves, one immediately hears that the engineer is not of much use. I have heard from different managers that they are not of much use for a year, and my idea and object is to have them thoroughly trained before they leave our technical school so as to be of some use.

Q. The men you put on, say, to motor repairing work have already done—how much is it in your school—18 months?—*A.* Eighteen months.

Q. They do not do any particular harm to the motor cars there?—*A.* No, we don't allow them near the motor cars. We put them through a course for six months in blacksmithing, and put them into the machine shop for nearly two years before they are allowed to touch the cars. We did try them earlier, but it was a failure. It required so much constant supervision to give them an idea of the working of the tools, and how to do jobs, before we allowed them to touch a car.

Q. What is the total number of years of training in your school?—*A.* Four years.

Q. Have you been long enough established to get any idea of results: are your men out in the world already, earning their living?—*A.* One of the first-year students ran away, because he could get Rs. 50 instead of Rs. 7, but our drivers all seem to be doing well.

Q. That is a different thing; they are not engineers. You have not yet turned out any qualified engineers?—*A.* No.

Q. When will they mature?—*A.* Not before July, twelve months hence.

Q. What then do you hope to get for them; what kind of posts?—*A.* At present there is no motor mechanic in the Central Provinces at all. We have had two letters from Bombay, asking if we could supply them. This we have been unable to do. As the motor industry is increasing very quickly in this country, there ought to be plenty of work for them after two years.

Q. Do you turn out men also who would go as engineers to places like the Empress Mills?—*A.* Yes.

Q. And who may go to be engineers at these various cotton-pressing and ginning mills?—*A.* Yes.

Q. Do you insist on an English standard?—*A.* Yes.

Q. All your men pass the English standard?—*A.* Yes.

Q. And consequently they would be eligible for a first class certificate?—*A.* They are.

Q. Would they be able to sit for that certificate immediately on leaving your school?—*A.* They must pass first and have at least twelve months' training as a second class engineer before they are allowed to sit for a first class certificate.

Q. What kind of certificate would you give of a kind that the country would recognise? You don't qualify them for any university degree, and I suppose there is no recognised diploma at present. What will you do? Will you give them some kind of label or tag that will enable the country to recognise your men from others?—*A.* They can pass through the school when qualified.

Q. Have you established any regular degree yet?—*A.* I am not aware of that.

Q. You have fixed a four-year course; at the end of the four years do you give the men, certificates?—*A.* It has not come to that yet.

Q. Is that in view?—*A.* That is in view.

Q. You are at present under the Education Department?—*A.* Yes.

Q. You have then in your school two distinct constituents, the class turning out merely motor drivers, and the class training men to be engineers?—*A.* Yes, we have up to the overseer class in the Civil Engineering Department, the Mechanical Engineering Department, and the Motor Mechanics Department—three departments.

Q. They are all distinct from the men who become merely chauffeurs.—*A.* Yes.

Q. Does the training of the chauffeur class interfere with the other classes?—*A.* No, they are separate altogether.

Q. Do you think that a school of that kind ought to be under the Director of Industries, and not under the Education Department?—*A.* I think it ought to be under the Director of Industries. From my point of view we are training men to further industries, and the Department of Industries will have more sympathy with them.

Q. What kind of training do they get in mathematics and the principles of engineering after they come to you?—*A.* That goes under the Theoretical Department.

Q. Do they get lectures in your school?—*A.* They go to the College of Science.

Q. What is the proportion of time; how often have they got to go for lectures?—*A.* From 12 to 4 every day, except Saturdays, when they go from 7 to 10.

Q. Before 12 they are doing practical work in the shops?—*A.* From 7 to 10. I would have it the other way about. I would prefer a greater amount of time devoted to practical work, and less to class work.

Q. Do they learn drawing in the classes?—*A.* Yes.

Q. Now you have got men in the third year; do they show promise of being good engineers?—*A.* Yes, two; and the civil engineers as well. There are only five mechanical engineers, and two show great promise.

Q. No provision is being made for training electrical engineers at present?—*A.* Not just now, but it has been spoken about, I believe.

Mr. A. Chatterton.—Q. You told the President that there were three classes of students in this school, civil, mechanical, and motor engineers. Do the civil engineers go through the course of workshop training?—*A.* Yes, through carpentry and blacksmith's work, so that they may understand something about wood and iron work in connection with building.

Q. You give them a kind of manual training?—*A.* Yes.

Q. In the mechanical engineering course, which lasts four years, they spend three hours a day in the workshop; is drawing included in the three hours?—*A.* It is included in the four hours for theory.

Q. Is this school equipped with prime-movers? *A.*—Yes, we have 12 N.H.P. boiler, 55 B.H.P. high speed engine, and two dynamos in tandem, 17 K.W. each.

Q. Do you wish to make your workshops as far as possible into a factory for turning out commercial work?—*A.* No, I would have to take in outside work, such as repair work for the mechanical department. We get quite sufficient for the motor car department, but in the mechanical department we do little, and I would like to do more outside work.

Q. That system probably works very well in the case of an industrial school, where you train a large number of artisans; but when you come to train a much higher class of student, is it not better that they should go through a regular, definite course of instruction? Would you not discriminate between an industrial school—such as the School of handicrafts—and your own school, where you are training a very much higher class of student? Would it not be more economical to put the student through a regular course, rather than let him take up mistrie's work?—*A.* By taking in outside repair work, you get different varieties of work which give the student an idea of practical work. For instance, a centrifugal pump comes along to be cast; you can give him an idea what it is like, whereas he would never see it until he went outside. He would probably see a model of one, but making a new one is a different thing altogether. Or, say, a part of an engine comes in for repairs, it gives him an idea of the work.

Q. Does this kind of instruction tend to the formation of rather sloppy ideas of work which would not be the case if you had a regular course of instruction?—*A.* We give them a regular course of instruction, but this is above that. This is in addition to the regular course of instruction.

Q. That is to say, you cut short your theoretical instruction to provide more time to this repair work?—*A.* No.

Q. You said you would rather have four hours than three hours for theory?—*A.* I think three hours are quite sufficient for theory per day.

Q. If that includes drawing, drawing takes up a considerable amount of time?—*A.* There are two days for drawing alone, two afternoons; that gives six hours' drawing per week.

Q. Do these students go through any course of experimental work with the engines you have installed?—*A.* Yes, they have Wednesdays and Thursdays for that. We are only starting that now. They are allowed two days for that per week.

Q. They do that in the afternoon?—*A.* Yes, it would take the whole day to do it, *i. e.*, seven hours.

Q. How many civil engineering students, and how many mechanical are there in the school?—*A.* We have got about 17 civil students altogether, and 23 mechanical.

Q. When do the civil students get provision for surveying?—*A.* That comes under a different department altogether—the civil department.

Q. You have the civil students in the workshop?—*A.* Just for the first year.

Mr. C. E. Low.—Q. Is it necessary for you to keep in touch with employers?—*A.* We have to make provision for these students after their time is up.

Q. You also want to shape your teaching to produce the kind of man that is employable, and you also want to get repairing work. What is your arrangement for keeping in touch with employers?—*A.* If we visit these places we may see what sort of work is going on, and if a certain student, for instance, said he would like to take up power station work, or go to a mill, we would push him on in that direction.

Q. Have you any Board of Visitors, or any body on which there are industrialists, mill managers, etc.?—*A.* I believe there is. I have not been in touch with it.

Q. You have personally visited a good number of mills in these provinces?—*A.* Yes, you sent me two years ago.

Q. Your knowledge of these gentlemen has helped you with the school, do you think?—*A.* It has.

Q. And when you contemplate the position of these boys passing out, and you have got to do your share in trying to get them employment, what steps do you think of taking towards that?—*A.* In the first instance, during the last year, the 4th year, we are going to put out these boys for six months' practical training. (Now 9 months.)

Q. Whom are you going to get to take them?—*A.* I have been in communication with one or two people, who have mentioned that they can take them.

Q. You have got more or less of a promise that these people will take them?—*A.* Yes.

Q. As improvers?—*A.* They will be improvers.

Q. You don't know what arrangement the Education Department makes to keep themselves in touch with employers?—*A.* I don't know.

President.—Q. You said that you might have to make a centrifugal pump, and that the making of such a pump for actual use would be a very different thing to making a model. There is an obvious advantage in making the real thing, but at the same time, would there not be a disadvantage in the fact that these men would be able to make a centrifugal pump again, and possibly nothing else, and the time devoted to that might be devoted to general questions of wider application. You would rather work on actual samples of that kind than you would on a series of models?—*A.* Yes, I would rather have actual work. Many things work out very well in theory, but are different in practice.

Q. You would be able to cover the ground that way in a four years' course? You would only have two years after they had gone to the blacksmith's and carpenter's?—*A.* Yes; in the pattern-making they would have an opportunity of making a pattern of new materials after they have gone through their own regular course.

Q. The danger is that you might find your students practically with only one or two types of things, repeating work largely. You have not thought of any kind of diploma for these men?—*A.* The Director of Public Instruction, and the Principal of the College and I would look after that.

Q. You are Principal of the school?—*A.* No, I am Superintendent of the workshops.

Q. You are really a branch of the College of Science?—*A.* We are supposed to be attached to the College of Science.

*NOTE.—*Since giving evidence a Board of five gentlemen has been appointed who are employers of labour—
A. G.

Q. The whole thing is in an experimental stage at present?—A. Yes.

Witness here added.—With reference to the training for these second class engineers, and to the question whether they should have practical tests as well as theoretical tests, we have had instances of people coming down and saying that these engineers who pass through technical schools and go straight for a second class certificate are of very little use for practical work. At home the Board of Trade distinctly recognises that you must have four years' practical work before you are allowed to sit for your second class examination.

Q. Your own training has been largely in motor engineering?—A. Yes, and electrical.

Q. Do you think that there would be any scope here for introducing electrical engineering?—A. There ought to be a great deal of scope.

WITNESS NO. 152.

The Hon'ble Mr. B. P. Standen, C.I.E., I.C.S., Commissioner, Berar.

Written Evidence.

The opinions and suggestions put forward are based mainly on experience in Berar during the past five years.

Financial aid to
industrial enter-
prises.

2. Existing industrial enterprises in Berar are limited to railways, cotton spinning and weaving mills (3), oil mills (3) and cotton gins and presses. There was a match factory in Ellichpur, but it ceased working some years ago. In all the towns and large villages there are a few flour mills worked from an oil engine, and a few agricultural unions have their own small ginning plant with the same source of power. An inappreciable amount of railway stock is held in Berar. In 1913-14 I had some correspondence with Messrs. Killick Nixon (the Agents of the Central Provinces Railways Company) on the subject of exploitation of local capital. I suggested the appointment of local agents for the collection of capital and the payment of dividends through station masters. The company informed me that they would consider the matter, but I have not heard from them since and have not pressed them for an answer as they are not, I believe, contemplating the collection of additional capital at present. The cotton mills, ginneries and presses are largely financed by Bombay firms; but two spinning and weaving mills and a large number of gins and presses belong to merchants usually from Rajputana or Gujerat who reside in the Central Provinces and Berar. Some of these concerns are joint stock companies, but the number of shareholders is always small. The number of gins is in excess of the requirements: to avoid the rate cutting which ensued, the gin owners in some of the large centres have from time to time combined to keep up the rates, and pool the profits, some of the gins remaining closed. One of the oil mills is a joint stock company with a very few shareholders, all of whom belong to the professional class; another is a private concern, and the other belongs to an important Bombay firm. The match factory was mainly financed by pleaders, I believe. Rao Sahab G. N. Sahasrabudhe will tell the Commission about this factory. The flour mills belong to individuals; the cotton gins used by agricultural unions belong either to individual members of the union or to all the members jointly; in the latter case they are purchased by money advanced to the members by the co-operative societies to which they belong.

The central co-operative banks get their money mainly from Government servants and pleaders; some well-to-do Deshpandias and Deshmukhs have also bought shares or deposited money with them, but they have done this from philanthropic motives or the desire to please their friends or the Government and not because they wish to invest their money in a good concern. These banks pay from 7 to 8 per cent dividend and 5 or 6 per cent on deposits at a year's notice. In the most advanced credit society a few of the members (Kurbli cultivators) have begun to deposit considerable sums (Rs. 700 is the largest individual item, I believe) at 9 per cent.

Wealthy people of the agricultural class who have money put by usually employ it in money-lending business themselves, but a few deposit large sums with Marwari Sahukars on 6 per cent.

There are very large sums lying absolutely idle in the form of ornaments, gold bars and cash. The house of an up-country Brahman (whose family made its money originally by selling houses to the Nizam a couple of generations ago) was broken into recently: the thieves took away 1½ lakhs in gold bars and cash and left more than 4 lakhs. Very large sums are spent on ceremonies (e.g., a quarter of a lakh on a marriage pandal alone). Public benefactions are rare.

The substitution of Roseum cotton for the Gaonrani is adding very largely to the wealth of Berar. About ¾th million out of the 3 million acres under cotton is now under that variety and when it has monopolized the whole cotton area (probably within ten years) the value of the crop at moderate prices will be increased by 1¼ crores per annum without extra expenditure or risk.

There is now a very large amount of capital in Berar which might be used for industrial purposes without inconveniencing agriculture, and the introduction of Roseum is largely increasing it.

✓ Capitalists are shy of investing in industrial enterprises because (1) they consider money-lending more profitable; (2) they cannot persuade themselves that they can safely entrust their money to an impersonal thing like a company over whose operations they have no direct control; (3) they are deterred by ignorance of method of investment and payment of dividends, which must appear prohibitive to a man who knows no English. The problem of the exploitation of capital for industrial purposes should be attacked in two ways, *viz.*, by making money-lending less profitable by means of the extension of co-operative credit organizations, and by demonstration of the advantages of industrial investments. It was early discovered that there is only one way of persuading the cultivator that a new use for his land is profitable and that is by demonstration, and we can only persuade the mofussil capitalist that there is a profitable new use for his money by a similar method.

Co-operative credit is well established in Berar and it has just taken a new departure of the utmost importance by the issue of first mortgage bonds for the repayment of old debts. The importance of the step arises from the fact that it will not only remove one of the greatest obstacles to the development of co-operative credit, but will provide a means of familiarizing people in the mofussil with the advantages of investment. A part of any future issues of capital for the construction of light railways in Berar ought to be reserved for local subscription, and subscription and payment of dividends should be facilitated as suggested above. If there be opportunity for the establishment of a new industry (*e. g.* match-making or the manufacture of paper pulp from cotton stalks) in Berar, it should be established on lines which will facilitate its utilization as a demonstration of the advantages of investment in industrial enterprise. If there is any doubt whether the enterprise will be profitable, Government should establish a pioneer factory, and if it proves successful, every effort should be made to attract local capital from the classes which are at present most distrustful of investment.

Government assistance in the establishment of industries should, in my opinion, be limited to the establishment of pioneer factories to ascertain whether a new industry is commercially profitable and guarantee of dividends with the object of attracting capital. It is essential that the method adopted to secure this latter object should be such as will obscure in as small a degree as possible the real commercial value of the enterprise, and a guarantee of dividends is particularly well suited in this respect.

Government should pioneer new industries and industries which it is proposed to establish in new localities in which conditions are so different from those in which the industry has been already worked that there is doubt whether they will prosper. As an example of the first I would name the manufacture of paper pulp from cotton stalks and of the second the manufacture of matches in Berar. In the case of the former, we know little more at present than that a good pulp can be produced and that there are ample supplies of the raw material at a low price, and before a pioneer factory were established further investigation would be necessary. As regards the latter, we know that there is a good market, that passable material for boxes can be obtained in large quantity on the hills to the north of Berar and that splints might be imported from Northern India at a low cost. We also know that an attempt to make the splints locally was unsuccessful.

Training of labour
and supervision.

I have been President of the governing body of the Berar Victoria Memorial Technical and Industrial Institute for nearly five years. This institute has two departments: the upper department takes boys who have passed not less than the 6th English Standard and trains them to take the 2nd Class Mechanical Engineer's certificate. The lower department takes boys who have passed the 4th Primary Vernacular Standard and trains them as carpenters, smiths, turners and fitters.

Outside large factories there is no demand for accurate and durable work, and it is extremely rare to find an artisan who takes a pride in his work. The customer is content with what contented his father and the workman is intent only on filling his stomach with as little inconvenience as possible to himself. These two propositions seem to me to dominate the problem of the training of labour.

Probably the best way of creating a demand for good work is by the introduction of new forms of articles in common use: a cart wheel accurately made of good material on the existing common pattern will be no more in demand than the ordinary cutcha article, but a wheel on Mr. Cove's pattern will fetch a higher price and pay the workman for the greater labour and better material employed. An organization for introducing such things to the notice of the people exists in the agricultural associations and unions. To produce the proper spirit in the workman it is essential that industrial schools should be boarding schools under the management of a European Superintendent who comprises amongst his qualifications the qualities of a good scoutmaster. Such institutions should either have a commercial department of their own to which boys would be drafted as "improvers" after a couple of years' training or should have an arrangement with some workshop of good standing to employ passed students on similar terms for a minimum period. After two years in the school and three years in the commercial shop the boys would be ready to be planted out in suitable places (preferably their native villages) in the mofussil, provided with tools and a small working capital.

In this way the schools would in time have an effect on the standard of workmanship in the country at large, and a serious obstacle to the development of agriculture, *viz.*, the lack of skilled workmen to repair machinery and implements, would be removed.

Industrial schools should be under the control of the Department of Education, but the Director should have an industrial assistant to inspect the industrial schools and advise the Director concerning them.

It is desirable that the same qualifications should be prescribed all over India for mechanical engineers. At present the Bombay Government does not recognize the Central Provinces certificate, and young men from the Central Provinces and Berar are handicapped by this. It seems desirable to follow the lines of the Board of Trades examinations for marine engineers. It would probably be necessary to make special arrangements to secure a competent examining Board in some Provinces.

The construction of light railways in Berar would do much to develop the country. A beginning has been made and other lines have been surveyed: one of these is the line from Yeotmal to Wun. The G. I. P. Railway which constructs and manages these lines for the C. P. Railway Company is averse from linking up this proposed line with the Bengal-Nagpur 2' 6" line from Nagpur to Chanda because to do so will "short-circuit" the G. I. P. main line. This link should be insisted on. Chanda produces half a dozen commodities (coal, rice, oil seed, forest produce) which are largely imported by Berar and if these were carried direct into the heart of Berar by a line from Chanda to Ellichpur (the line from Yeotmal to Ellichpur already exists) the cost of carriage would be lowered and trade encouraged.

Railways.

Oral Evidence, 19th December 1916.

President.—Q. I have one or two points to ask you about by way of supplementing your note. One is about proposals for preventing the available money being used for money-lending and utilising it for industrial purposes. We tried to get advice on this point from one or two witnesses who seemed to think that it would be desirable and practicable to legislate for the purpose of limiting the interest that could be obtained by lending money?—*A.* I do not think so. The question was referred a few years ago by the Government of India and I gave the opinion that the most that we could do was that no one should recover through the courts more than double the principal.

Q. What objections had you to legislation?—*A.* I think the money-lender would always be able to get round legislation.

Q. By writing a false sum?—*A.* There are so many ways of evading the law. They can give a loan of only fifty rupees and enter a hundred. I think the history of the subject in other countries indicates the impossibility of legislating on the subject.

Hon'ble Sir R. N. Mookerjee.—Q. My experience in Bengal is that the cultivators and other classes are so clever that they will find loopholes in the law?—*A.* I think it all depends on the need of the borrower. If he is very much in need he is at the mercy of the money-lender who can always cover himself.

Q. It seems rather weak that we cannot deal with an existing evil by legislation. Do you think it will have a moral effect on the money-lender if he is made liable to prosecution?—*A.* We can simply refuse to recover the rate of interest if it exceeds a certain percentage. I do not know if the law will go further than that.

Q. It would not in any case amount to a criminal offence. It would come under the civil law of the country only?—*A.* There might be a penalty to the effect that a loan carrying beyond a certain rate of interest would not be recovered by the Civil Court.

Q. We had an opinion from a distinguished lawyer in Calcutta who was quite immovable on the point. He was quite sure that legislation would have a desirable effect in discouraging money-lenders from charging more than a certain rate of interest?—*A.* Of course he is speaking from wider experience than I can claim.

Q. It is not a question of experience. We are simply attempting to imagine what would happen if we legislated?—*A.* I suppose the position in the Deccan could be of some assistance. The Deccan Agriculturists' Relief Act contains various provisions intended to relieve the cultivator in one way or another. One of the provisions is that cultivators may not mortgage the land with possession but to evade this they sell the land outright with a verbal or written supplementary condition that if a certain sum is paid, it should come back. This practice has extended to the Berars from the Deccan.

Q. The Act is being dodged?—*A.* Yes. I believe the money-lenders told the officials that they did not mind what legislation was passed so long as they got some previous notice. You cannot save a man from himself. That is what it comes to.

Q. You have referred to the cotton gins that are used by the agricultural unions. They are in addition to the gins that are established throughout Berar, and some of the witnesses have shown that there are more gins than can be kept in full working and that these are

often set up in order to be bought up by a combine. Do the gins put up by the agricultural unions decrease the number of gins?—A. Not necessarily, I think. They are only put up for a particular purpose to gin the Roseum cotton. There is a great advantage in ginning at home because they are able to get the whole use of the gin.

Q. It is an advantage to have their own gins?—A. It is certainly an advantage.

Mr. C. E. Low.—Q. I understand that these small gins have been worked for custom also?—A. Yes.

Q. What is the ordinary rate per khandi?—A. Rs. 3-8-0, I think, where there is a combine. I think it is a good deal less where there is no combine.

Q. Where did Messrs. Killick, Nixon get the capital for their railway?—A. I understand a lot was raised from big capitalists. That is what I gathered from their letter.

Q. Don't you think that it is a very undesirable state of affairs that you cannot get local capital in a place which is prosperous and enterprising?—A. I do not think it is likely to come in without special efforts.

Q. Do you think that it is reasonable that Government should put some pressure in circumstances of that kind?—A. I think so, I think there ought to be a special man. Probably it might be necessary to put a Tahsildar on special duty for the purpose. You want somebody who could bring influence to bear on the people, somebody in whom they have confidence.

Q. Had you any talk with investors on the subject?—A. I have often talked with people. They gave me to understand that they could not take up anything that was new to them.

Q. You say it is due simply to the feeling of strangeness?—A. I think it is due to that mainly.

Q. We had evidence from one witness a day or two ago that, with the exception of two or three European firms and two or three outside firms, most of the capital in the ginning presses and factories was local?—A. I think that is mostly Marwari capital.

Q. You mean the Marwari settled in Berar?—A. I think so.

Q. Are there not local professional men who invest?—A. I do not speak by the book but my impression is that there are not.

Q. What do these professional men put their money into?—A. They have some in Government paper and there is a little in the railways and a good deal in the central banks.

Q. Land?—A. Yes, occasionally land also.

Q. Do the land-holding classes, such as the Deshpandias and Deshmukhs, put their money into gins?—A. I think there is only one who has got a considerable amount of money in gins. He is a regular business man.

Q. Do you think that investment in local railways would have an educative influence with a view to future industrial development?—A. I think so.

Q. If men are ready to invest in railways, do you think they would be likely to put their money in oil mills and paper mills started under auspices which gave them confidence?—A. Investment in railways would break the ground for them and make them more likely to come in.

Q. Have you seen any general outward manifestation of increase in prosperity or commercial progress, or greater capacity to manage their own affairs by the cultivating classes as the result of the activities of the Co-operative and Agricultural Departments?—A. I should say certainly that co-operative credit has done that to a great extent. I cannot say that the agricultural associations are very active at present.

Q. Do the taluq associations show more signs of activity?—A. There are half a dozen of them working. The others want pushing.

Q. Have you seen any signs of increased prosperity owing to the profits made on cotton and other crops?—A. I cannot say I have. I think that is largely because the Berari is very simple in his ideas. He is not a man for show at all.

Q. Has the standard of comfort risen?—A. It is too soon to say anything. It is only a matter of four or five years.

Dr. E. Hopkinson.—Q. What has become of the increased income?—A. I think a great deal of it goes into ornaments. Some goes into land also.

Q. There is no increase in their expenses?—A. They live a very simple life. They live most uncomfortably from the general Indian point of view of living. They feed simply and dress simply.

Q. And are content ?—A. Yes.

Mr. C. E. Low.—Q. Do you think that education has had no effect in increasing the standard of comfort ?—A. There is no question that the standard of comfort has risen in this generation. Everybody admits that. Even people who say that we are impoverishing India say that the standard of comfort has risen and is rising.

Q. Are there amusements of a western type and are they popular ?—A. There are cinemas now, and theatres are constantly coming round.

Q. You speak here of converting many of the advances on landed security into liquid security by the issue of mortgage bonds. Where does the money come from ?—A. From the provincial bank.

Q. What is the point of making the securities liquid or readily transferable ?—A. I suppose the idea was that they would be more readily taken up. If the thing goes on well, it will very soon get beyond the means of the provincial bank, and the bonds will have to be offered for subscription in the market.

Q. The money is advanced by the provincial bank ?—A. It is 2½ lakhs, I understand.

Q. Who issues the advances ?—A. The provincial bank.

Q. Issued locally in Berar ?—A. I do not know the details.

Q. The question is of interest to us in connection with the financing of industries. I understand that you have assisted Mr. Crosthwaite in working out a scheme ?—A. I have not assisted him in the details. I heard the details from him. It struck me as a sound idea. I tried to impress it on everybody.

Q. These shares would readily pass from hand to hand and would be readily saleable ?—A. Personally I think so. That is not the opinion generally held.

Q. What is the general opinion on the subject ?—A. The opinion of the Central Bank directors at Akola was that it would be difficult to get the borrowers to pay punctually because they had some experience of a similar arrangement on a small scale. They advanced to three or four societies. They advanced a small sum out of their capital for the repayment of old debts on the joint mortgage of the holding of the debtors and they found that the debtors were unwilling to pay unless they all paid in at once. That was why the directors held out so long.

Q. Do you anticipate any difficulty in getting competent local directors of industry with a business turn of mind ?—A. I think there would be great difficulty.

Q. What about the cotton mills in Akola ? Has their management been a success ?—A. I am told not. I do not think it is managed by Berar men. I think it is purely a Bombay concern.

Q. You speak of the agricultural associations and their organisation for bringing improved articles to the notice of the people. Do you think that agricultural associations are suitable for bringing to the notice of the people the industrial products ?—A. I think it will work in alright, because the associations have the mechanism for it. They have their annual shows and the people whom they would want to interest in industrial matters would be the same people as those who are interested in agricultural improvements.

Q. My point is this. Do you think that what I may call the cottage industries and the village manufactures could be pushed by a separate organisation ?—A. I think you want a separate organisation for village industries, not the same as that for large enterprises.

Q. You think that the agricultural associations would afford better means for pushing these things than organisations worked up *ad hoc* for industrial purposes. Do you separate cottage industries and the village trades from even the smaller forms of organised industry ?—A. Certainly.

Q. You say that the technical schools should be under the control of the Department of Education. Would that apply also to the higher forms of technical colleges or would you have them under a properly organised Department of Industries ?—A. I think you will have to introduce the education element somewhere. The two things should go together.

Q. Which is the more important ?—A. The industrial element is of greater importance.

Q. It has been proposed that the best way would be for the inspecting to be done by the Education Department and the administration to be under the Director of Industries ?—A. What I propose would come to the same thing.

Q. I think it is the reverse. Do you propose that the Director should have an industrial assistant and that the whole thing should be under the Department of Education ?—A. I think you will find that the assistant will be the man who will have the greatest influence over

the management of the institution. The Director would only have the guiding hand. If you made the Education man an inspecting man solely, the question is whether he would take sufficient interest.

Q. For the purposes of an industrial or a technical school you have to turn out boys who will be employable, and to this end it will be necessary to keep the school in close touch with the employers of labour and their requirements, and the kind of curriculum will have to be suited to that end. Do you think that the Education Department is likely to do this successfully?—*A.* I do not think it will make much difference if the Director of Public Instruction has a technical assistant.

Q. Don't you think that it will be more educational and less industrial as years pass on?—*A.* Not if the assistant to the Director were the right kind of man.

Q. Would he have done practical work?—*A.* He must have had it before his appointment.

Dr. E. Hopkinson.—Q. You suggest that Government should pioneer new industries which are doubtful in result. Do you not think there is considerable risk in that? If the Government takes up an industry and it fails would it not have disastrous effect?—*A.* I think that if the Government takes up a thing, it should do the thing in the same way as any private person would do it.

Q. It has been suggested by some witnesses that Government should take up only those industries in which success has been practically achieved or is certain to be achieved?—*A.* Then there is hardly anything to pioneer. I would certainly not advocate starting an industry in which there was not much probability of success. I presuppose that there is a probability of success.

President.—Q. Have you known of any cases in which Government pioneered industries?—*A.* I have no experience of such.

Q. Don't you think that the Government methods of doing things are a bit cumbersome to bring about anything like a commercial success?—*A.* They may be, but I see no other way of pushing industries.

Q. Supposing Government gave facilities to an industry instead of actually pioneering it, don't you think that will be sufficient?—*A.* If they ran the thing as much as possible on a commercial basis I do not see why it cannot be done.

Q. Government methods necessitate a departure from the ordinary commercial methods in tackling a new industry. There would be an absence of promptness. There is the delay in getting sanction and it would not be conducted with the same energy and initiative as in the case of a private individual?—*A.* Personally I think it is possible to do that under Government control. We have various grades of red tape in different departments.

Q. Would you not be in favour of giving facilities such as bearing a portion of the losses, a portion of the pioneering expenses, and finding a market for the goods and so on?—*A.* It seems to me that it leaves the matter indefinite. You might get some results. But it would be impossible to say how much was due to the special facilities given and how much to the persons who are doing the thing.

Q. You have no case in mind actually of Government pioneering industries?—*A.* No.

Dr. E. Hopkinson.—Q. The whole of the great improvement in cotton growing has been achieved without Government finance?—*A.* Yes, it has cost the people nothing. It cost nothing directly to Government but they have had to maintain the staff and that means so much money on establishment and things of that kind.

Mr. C. E. Low.—Q. There was certain direct expenditure incurred by the Government of the Central Provinces somewhere about the year 1904 or 1905 by way of purchasing superior cotton seed?—*A.* I cannot remember exactly.

Mr. A. Chatterton.—Q. Is it a fact that the Marwaris withdraw a considerable amount of money from the province?—*A.* Yes, they have all their homes in Marwar.

Q. You say you have been President of the governing body of the Victoria Memorial Technical Institute at Amraoti. Is there sufficient room in this province for two engineering schools, both training up to the second class engineering test? If you had one institution do you not think there would be greater efficiency?—*A.* I think there is not room for two such institutions; but I should not like to see the Amraoti Institute abolished, because it would mean a set back to private enterprise.

Q. In regard to the control of these industrial schools you suggest that they should be under the Department of Education. Don't you think that the Director is likely to be a fish out of water?—*A.* I think he would be a fish out of water to a certain extent, but the actual work would be done by the technical assistant whom I have in view.

Q. If he was under the Industries Department he might look for other prospects than simply remaining in the post of assistant to the Director?—*A.* That is what I contemplate when industrial development takes place.

WITNESS NO. 153.

The Hon'ble Mr. R. M. Dixit, Barrister-at-Law, Member, Central Provinces Industrial Advisory Board.

Written Evidence.

The great point to be noticed at the outset is that India is an agricultural country, and not a commercial one. The example that we have of British trade and industries is on such a grand scale that Indians cannot succeed in their attempts at copying this model straight off. What we really want are smaller industries which will supply the local markets with the necessary commodities at a rate which will compare favourably with the imported article. The bigger joint-stock affairs are a matter of slow progress, and they will take some time to engraft themselves on Indian soil, so that the point of view that I take is the smaller concerns which should not require a capital of more than Rs. 25,000. In the case of these concerns Government assistance could be rendered more effective by (i) grant-in-aids, (ii) loans with interest, and (iii) bounties and subsidies.

Financial aid.

The form of control Government should have is by inspection and audit. The real difficulty in such concerns is the necessity to have recourse to the local sowcar, who will not part with his money even with security on less than 12 per cent per annum. So that if smaller concerns could get money on cheaper rate of interest on security, it would be a real help.

But one thing is necessary, the mode by which such applications for help will pass through the official channels should be a little quicker than in the ordinary course of events. An aid given in time could save the industry, but profuse assistance given later would mean nothing.

I would, therefore, leave the Director in each province to have the final powers in sanctioning such relief up to a certain extent. If, in his opinion, the relief required exceeds his powers, a reference should be made to the head of the Administration.

A college of commerce really ought to follow the natural course of development. The first and foremost difficulty which must be solved is the general level of illiteracy. With a little more literate population the improvements would have more fertile soil to demonstrate their utility. But mere general education in the three R's is not enough, although it may be even up to collegiate standards. The dread or dislike which the educated people have for anything approaching manual work is at the root of all troubles, and the apathy of the educated class is mainly responsible for the inactivity which has characterised Indian industrial progress. To strike at the root of this disease, I strongly recommend that "manual training," or in other words "hand and eye" training, should be a compulsory subject in all Elementary, Anglo-vernacular and High Schools, if only to impress on the young minds the dignity and utility of labour. Somehow or other a very halting step has been taken in our provinces, but I cannot dignify this step even by allowing it the name of a beginning.

Technical aid.

The second suggestion I would earnestly make is that our general education curriculum is such that if, for want of accommodation or failure in the promotion examination or owing to some such cause, the boys are thrown out to the outer world, they are good for no other profession except clerks, petition-writers and copyists. This is letting to waste such a tremendous quantity of latent energy that the only remedy I would suggest is the establishment of duality in our educational system. Although the word "Germany" is at present rightly in very bad odour, still I think their system of primary and secondary schools in industries deserves copying. In fact what I suggest is that there should be two kinds of schools in every place—technical schools, as also the general education schools, primary as well as secondary. After these schools are in good working order, then in course of natural development collegiate instruction in technical subjects would be the next move.

As regards the question of industrial and demonstration schools, they cannot catch on unless they are made to run on paying lines. The best proof I can give is the demonstration farms in our agricultural department. The reason being that villagers who see the results get overawed by the tremendous expenditure incurred in getting these improvements.

Q. 15.—So far I find there has been no technical aid provided by Government except perhaps the institution of the Victoria Technical College and the Agricultural Research Laboratory. Even here the training is laboratory training, and not with a view for commercial gain.

Q. 20.—We want a network of peripatetic demonstration factories, say, of improved hand-looms, of small machines which could turn out useful articles to supply the neighbouring towns; also some wood-working factories.

Q. 24.—In the existing institutions available for research the staff should be augmented by the experts, who should be under the control of the Director of Industries.

Q. 25.—As regards research institutes in every province and an Imperial research institute, I would advocate a Central Research Institute situated in England where all our Provincial Directors and experts could send their enquiries. I recommend this, since I think many expert research workers cannot be spared from England for supplying the necessary number to each province in India. Taking five research workers to each institution for each province, it will come up to 35 experts. Besides a real expert must charge a fancy price to come over at such a distance and even then perhaps the climatic influences may tell on them. So besides the commercial enquiries, etc., will have really to be made in England and Europe generally so that research institutes situated in each locality will not be of much use. It is better to have one really good institute with 10 to 15 men, than have seven with five experts each. As experts and research workers are so few I am tempted to suggest this.

Assistance in marketing Pro-ducts. Q. 28.—Our Board has already approved of the idea of commercial museums, and I agree most heartily in the same.

Q. 29.—The museum should be on a small scale in each district and a central one at the head-quarters of the province. The District Council or the Municipalities or either would, I am inclined to think, be glad to maintain such institutions under the directions of the Director of Industries.

Q. 32.—At the present day there is immediate need for popular exhibitions, but ultimately as people begin to be aware of the existence of these exhibitions, they should then be converted into exhibitions aiming principally at bringing sellers and buyers in contact. In our economic system the village fairs were a great institution. These could suitably be managed in the idea of popularizing several cottage industries, which are likely to interest the people in an active way in those particular industries. The exhibition should have demonstrations at stated periods where the semi-ignorant multitude could see the working of the models.

Q. 36.—Trade representatives in other provinces would be unnecessary, since the provincial Directors could easily be in touch with each other, particularly so if we have periodical publications issued by each province.

Q. 37.—It would be a very welcome change if instead of the present system of indenting from England, lists of articles in vernaculars and quantities wanted could be made available to the public and tenders invited from the general public interested in the same. In our province, wherever an industry has showed some signs of life, the Director has also recommended the articles to Government purchasing departments.

In this respect also I might mention that our D. P. W. workshops have plenty of capacity in turning out efficient and good quality work, and yet even the Government and semi-Government departments do not indent on it to any appreciable extent. The mere maintenance of an up-to-date workshop on paying lines as it undoubtedly is at Nagpur has in itself a very great educative effect, and patronage, if denied, even to such institution, all progress in industries must be despaired of, if for every single trifle of a hitch, we have to send our broken parts to the Bombay or Calcutta firms for repairs.

Land policy.

Q. 41.—The malguzars are made to feel that their principal business is to increase and improve agriculture in their villages. There is always a look cast askance in case lands are booked for industrial purposes. In fact the Land Revenue Act is framed solely with a view to land revenue. Concession should be given on a liberal scale for enterprising cultivators to cultivate on some scale near the irrigated tracts. Experiments have been begun in this direction by giving out land on concession rent and premium in Chanda district and also in Chhindwara district. If these concessions become a little more general in experimental enterprises with a proviso of forfeiture after six years and a sliding scale of rents, a good deal of fruit cultivation, notably sugar-cane cultivation, could be tried.

Q. 43.—The tendency of industrial concerns being to grow from small beginnings to respectable proportions, help from the Government in acquiring land would create an amount of dissatisfaction amongst the resident public. In Bengal there may be difficulties, but in our Province at all events land is easily obtainable, and no reason exists why industrial concerns should be helped in this manner.

Training of labour and supervision.

Q. 44.—Except the Engineering School, very recently opened, on which it is impossible to base any conclusions, we had no facilities for the training of labour.

A school of handicrafts in Nagpur is about the only other institution which supplies a real need. The pupils turned out from the institution are quite competent and have already acquired a good repute. It is multiplication of institutions like this that is urgently necessary. I have dealt with this in greater detail in the part dealing with education.

Q. 50.—Industrial schools should be under the department of Industries.

Q. 53.—Government should make it a condition before giving assistance that apprentices will be trained in those concerns.

Q. 54.—The other day a question was put in the Local Legislative Council, and from the reply I gather that the question of recognising certificates intra-provincially is engaging the attention of the Government. Mechanical engineers.

Q. 55.—Practical demonstrations are necessary for showing comparative saving of labour, e.g., in the case of hand-loom.

The Government have established a nominated Advisory Board to assist the Director of Industries. The Board has on the average met once a year. It has engaged the services of three experts, and these experts have been busy in doing their work—particularly the textile expert who has been busy at improvements and cheap production of labour-saving devices in hand-loom and who has been busy giving a new impetus to the blanket weavers' industry as also the *kossa* or tussar silk-weaving. The other expert in handicrafts has also had his share of work in metal and woodwork. Official organisation.

The present constitution of the Board seems to be not quite liked by the people. There were one or two interpellations in the Local Legislative Council on this subject of the constitution of the Advisory Board.

The Board would improve very much in its activities if more powers are given to it and some specific amounts are placed at its disposal from year to year. The members constituting it should generally be proportionate to the commercial activities of the various districts. At least as a start, it should consist of representatives from each division with suitable travelling allowances to the members, official or non-official.

Qs. 64, 65 to 68.—I am not in favour of an Imperial department.

Q. 69.—The control of the experts should be left to each provincial Director of Industries. Technical and scientific departments.

Q. 74.—The co-ordination of research could be very well secured by the issue of an authorised periodical publication in English from each of the provincial directories. This could be issued in the vernaculars of the Province where research is carried on: presumably since local conditions will dictate the lines of enquiry.

Q. 98.—Railway freights are evidently fixed on no definite basis. They are neither by distance nor by weight, but each article is freighted separately. This was particularly noticeable when, on enquiry, I learnt that Kaolin brought to Bombay from Gwalior would leave very little margin for profitable working, only owing to railway rates; and besides the general question of the railway companies' non-liability even in cases of total losses of consignments has a great deal to do to prevent industries starting on any scale. Even as regards coal, formerly there used to be a system by which weightments could be made of waggons on payment of a fixed amount. Even this has now been done away with. This means that if, despite the general supervision of the railway company, goods are lost in transit, no one is responsible. The risk form which is used is responsible. Railway freights.

In these respects, I think that the time has come when the general public should not be left to the tender mercies of the rival companies, but that the freight rates should be fixed by the Government or some central body. By the way I might also mention that the railway companies do not even regularly supply the information wanted by the Government regarding returns of exports from particular stations.

Q. 104.—Iron is particularly one of those which deserves to be developed at public expense. There is only one flourishing concern—the Tata Iron Works. India could, it seems to me, give ample room for working of at least half a dozen factories. This should be in the first instance a Government concern. Mining and prospecting rules.

Qs. 110, 112 and 113.—The following are the industries which I suggest as suitable for investigation with a view to their development, since we have abundant raw produce:— General.

(a) Paper pulp from cotton and hemp stalk, raw cane-sugar refuse and *bhutta* corn-stalks.

(b) Thymol crystals from *ajwan* seed. This cannot be undertaken successfully until a liberal provision for the supply of absolute alcohol is made.

(c) Bone, and its conversion into { buttons,
combs,
bone-powder for manurial purposes.

- (d) Lac and its refining by improved methods. Lac bangles.
- (e) Marble and its polishing.
- (f) Tobacco and its curing and allied manufacture of cigarettes.
- (g) Glass-making.
- (h) Papein from papayya fruit.
- (i) Cassein.
- (j) Chemical industries generally, *e.g.*, production of potash from sunflower stock; producing acids from Harra Myrabolams, extraction of acids from the orange skins.
- (k) Graphite industry and pencil-making.
- (l) Leather tanning.
- (m) Sugar industry.
- (n) Oilseeds and cake.
- (o) Lemongrass oil industry.

For the chemical industries generally, Government assistance in the concession of use of duty-free alcohol would be necessary. Only with duty-free alcohol can these chemical industries prosper, since alcohol is the most important substance in this department.

I am interested in the thymol and marble and lac and bone industries and last, but not least, paper-pulp from cotton-stalk, and potash from sunflower plants.

Oral Evidence 29th December 1916.

President.—*Q.* In answer to question 104 you say, "Iron is particularly one of those industries which deserves to be developed at public expense. There is only one flourishing concern—the Tata Iron Works." There are two as a matter of fact?—*A.* I am glad for the correction. I think I advocate half a dozen. We have raw material for it.

Q. Do you wish the Government to start another concern to compete with these two? Don't you think that the Government have already issued enough information and these two pioneers should set the example for people to develop iron if they wish to?—*A.* One throughout the whole of India is hardly enough for popularising.

Q. Don't you think that there would be a distinct grievance if Government started iron and steel works in opposition to these two?—*A.* Not in opposition. Tata is solely working for gain, but the Government concern need not necessarily aim at profit-making so much. As a matter of fact, there would be room for concerns managed by Government to work without competing with the other firms. I mean these institutions have really very great educative effect. In that sense I advocate them. I suggest this proposal with a view to accelerating the pace of advancement. So far as the local supply of local markets is concerned, there would be the old style of iron works. It would be difficult to work with the huge capital that was spoken of just now, and that is why I began by saying that I am not so much for these huge undertakings, but smaller industries ought to be given an impetus.

Q. In what way are you going to start a small industry in iron and steel? You invite failure at once if you go on with these things on a small scale?—*A.* What I suggest is that there are small articles which can be made locally which will compete with things imported from outside.

Q. You have not given us anything definite as to what you would like to be done in this matter? You want the Government to start a small iron and steel factory?—*A.* In that respect I expect a bigger undertaking to be undertaken. The Central Provinces are supposed to be full of raw iron ore.

Q. Where can you get your coking coal from?—*A.* I could not say very much about that. If an investigation can be made, I submit the Central Provinces experts would be able to come to the conclusion that there is a fair field.

Q. What sort of provincial experts?—*A.* I am afraid we have no iron expert.

Q. You must have all the conditions favourable. You must have coking coal, water, people to run it. You do not wish us seriously to consider the proposal for urging the Government to start any other concern in the Central Provinces as a competitor with the Tata Iron and Steel Works?—*A.* At least I should be satisfied if the Government have really made the necessary enquiries in this province.

Q. The Government is collecting the necessary information and making it available. These two concerns, which show a certain amount of enterprise and risk their own money and reputation, have been successful and you will harm them if Government pioneer an industry of the same kind in another province. These people have shown what can be done with the information available, with a certain amount of enterprise. We do not want to discourage similar enterprises in other parts of India. The existing enterprises have a greater educative effect than anything that we can possibly do on behalf of the Government. It is exactly the form of education that we want to see. We have got two good examples, and surely you do not want to take the varnish of these two? You do not wish to push your proposal?—*A.* If they have already come to the conclusion that the conditions in this province are not favourable after investigation, I have nothing to say.

Q. It has not been definitely settled that they are unfavourable, but I have introduced you to this point, because that brings me back to your answer to question No. 69, where you say, "The control of the experts should be left to each provincial Director of Industries." Do you mean to say that the provincial Director of Industries is going to be provided with experts for iron and steel, oil, soap, glass and everything else that you can think of in the way of industrial development?—*A.* I do not think that he can take up all subjects at the same time, but I think one or two subjects for a limited period would be quite enough for the Director. Every province would need experts, and if there is co-operation between the different Directors it would be easy to secure work for the experts. If an expert has made his utility felt he is bound to continue.

Q. If these experts were to work sometimes in the Central Provinces and sometimes in the other provinces, why not make them imperial officers available to all the provinces? That is exactly the suggestion made in the question, whether they should be imperial or not? But you are against an imperial department and say that the experts should be under the provincial Directors?—*A.* My point is that research work should be carried out in England or some other central place.

Q. Research work of the kind done by the Agricultural Department could not be done in England? You do not mean that research work could be done more conveniently in England on Indian raw materials than in India itself?—*A.* The convenience of that system would be better.

Q. How much material would you have to send to England to serve as tests? Raw materials differ from district to district, and province to province, from one season to another. If you are dealing with a plant or a vegetable of any kind, it will vary in quality from one week to another in the period of its growth. Could you have research made in England with all these different varieties of materials? And the people to engage on research there would be men who know nothing of Indian conditions and would not follow the research?—*A.* I have suggested this proposal, because I think it would be difficult for the experts to come here such a long distance and even if they do come out, they will not stay here very long.

Mr. C. E. Low.—Q. It was said the other day by a witness that the failure of attempted primary agricultural instruction in schools in the Central Provinces was due to the fact that the teachers taught facts and not methods or principles. That means that teachers were not properly trained although a good deal of money was spent on their training. Have you got any idea of how that difficulty could be got over?—*A.* I think the number of training schools that we have at present is not enough. That is one difficulty, and the second is that there are not very many chances of good promotion for the teaching staff, and that is why you do not get the proper material for that profession.

Q. While admitting the desirability of commencing this sort of training in primary schools, don't you think that in view of the very large number of primary schools there are, and the still larger number there ought to be, it might be as well in the first instance to confine manual training to secondary schools?—*A.* I think that if a beginning has got to be made, it is the younger mind that is best for that kind of training.

Q. I was talking to a young man in the engineering school this morning and he told me that his bent towards mechanical engineering came from the fact that he received manual training in the Poona High School which had given him an idea of carpentry, and that the result of that was that he was learning mechanical engineering. That is a case of the good effect of this type of education in secondary schools. Don't you think that there would be a good deal of effect even if we confined manual training to secondary schools?—*A.* I do not say that if you introduce it in the secondary schools it will not produce any good, but I think it will be better if we start from the beginning.

Q. Don't you realise that you should have a sufficient number of teachers trained in the right way for primary schools for this purpose? I think you will agree that the men for this particular purpose of nature study and hand and eye training must be taught on the right lines, otherwise they are worse than useless?—*A.* It is just like the general literary training. You train the boys to go up for the matriculation, and in the preparatory classes the number of students is limited and the poor fellow has got to go out and he is quite useless. If you include this subject, he would not be worse than he turns out to be at

present. He will be able to devote himself to some manual pursuits and earn his own living. If we want to solve the difficulty we should begin with the training schools. I find that even in the case of girls the number of pupils turned out of the training schools is practically the same for the last ten years. If there are more applicants, there is no admission, and when we ask for the progress that has been made in that line we are told that there are not sufficient teachers.

Q. You are sure of the fact that there is no progress in the normal schools during the last ten years?—*A.* I am very nearly correct, because only about three months ago we had the Female Education Committee.

Q. You are speaking of female education only?—*A.* Yes. That is why I say that our beginning should be multiplication of these training institutions.

Q. The number of male teachers turned out by the normal schools has increased a great deal in the last ten years?—*A.* Yes.

Q. You speak of the idea of having two parallel systems of education, technical schools and general education schools. You think that boys would readily enter the technical schools?—*A.* I think the boys do not enter the schools according to their desires, but according to their parents' desires. What you want the nation to do in the next generation the pupils must be taught in the present generation. Unless you instil into the boys some desire to do a particular thing, the next generation will not think of it, and it is our present generation which really thinks badly of manual work.

Q. What you mean is that if you give the boys manual training in the primary school a very fair proportion of boys when they come to the stage of secondary school would choose technical branches?—*A.* Yes, and the colleges and universities would not be so cramped as they are at present.

Q. You speak of pioneer and demonstration farms. What do you mean by demonstration farm?—*A.* There are several improvements carried out in the agricultural farm, but at great cost.

Q. I may explain to you the difference between experiment and demonstration. Demonstration work is done, as a rule, by getting the cultivators to cultivate or by teaching them how to cultivate plots of certain lands so that their neighbours can come and look at them. Also agricultural assistants and people of that kind go out into the districts and explain practically in the district what the advantages of certain improved methods are. That is what we call demonstration. In the case of experiment, there is a high paid staff, and comparatively extensive buildings, and there is very little demonstration work, comparatively speaking on the farm. Do you consider that the agricultural department has not enabled the people to follow up its lessons?—*A.* That is exactly what I mean.

Q. We had evidence yesterday that the people of Berar were getting a profit of over a crore of rupees by sowing the cotton seed introduced by the department. Do you consider that it has not proved a success?—*A.* What I mean is improvement of agriculture by means of labour-saving devices. Researches are no doubt done by the research department, but the transmission of the results to labour-saving devices is a difficult problem.

Q. As regards commercial museums, there is a certain amount of confusion in many peoples' minds. There is one kind of museum where the process is shown and that is called the industrial museum. The other is a sort of glorified sales room which show all kinds of things that are made in the country, and the things can be bought or orders can be given. The latter is the type of commercial museum at present existing in Calcutta. It is intended, as far as possible, to assist the owners of small factories to market their wares. Which kind have you in mind?—*A.* As far as the museum part is concerned, I had the commercial part of it in view.

Q. With reference to your answer to question 37, do you think that assistance could be given to Indian producers if there were a stores department in this country so as to arrange for a more or less joint order, and secure co-ordination of supply to the consuming departments here from the Indian producers?—*A.* I am afraid I have not thought about the point. It seems to me that that would be a distinct step towards the furtherance of local enterprise.

To Mr. A. Chatterton.—*A.* I am a member of the Advisory Board for Industries. The Board meets once a year.

Q. What are the functions of the Board?—*A.* We go there when we are called. If any one has any suggestions to make, they are discussed and enquiries undertaken, but I do not think that we have any defined powers.

Q. What kind of suggestions are put forward for consideration at these meetings?—*A.* For instance, the last time we met, we were discussing the question of dyes, and it turned out in conversation that a black vegetable dye is being actively used at present in Nagpur. So the Director thought that that was something which could be investigated and he made enquiries, but at present we do not know how far he has gone with them. Any

member, if he has anything to suggest, suggests it to the Director and then if the Board approves of enquiries being made in that connection, we have a commercial agent who goes round the place and makes the necessary enquiries.

Q. Can you give me any instance of a practical outcome of the work of this Advisory Board?—*A.* I do not know whether the Advisory Board can take credit. Our textile expert is doing some excellent work as well as the School of Handicrafts.

Q. But the textile expert is not working under the Advisory Board?—*A.* That is what I say. I do not know exactly what our powers are, but when our Board meets, I think, reports are submitted by these gentlemen to the Board.

Q. The Board takes credit for the work they do?—*A.* I do not know whether the Board can take credit. If there is any subject that comes up, whatever I know about it I put before the Director and I am glad to find that the Director generally investigates a matter if it is really worth investigating.

President.—Q. Are there any supplementary remarks which you wish to make?—*A.* There are some industries which it is impossible for private enterprise to take up. I shall only mention two instances. One is the marble industry in our province—flooring tiles and marble tiles. In Batul we have got a marble mine and I took samples to Bombay and enquired about the rates for cutting and polishing. I found that the rates, with the railway freight, are so great that they can be got cheaper in Bombay. It is impossible for private enterprise to take up the matter. Government should open a marble factory and if it is successful, there will be many people to come forward and take it up.

Q. There is a marble factory at Makrana. You can send young apprentices there to learn how the things are done?—*A.* The other is thymol. I understand that it is being worked at a great profit in Baroda and Calcutta.

Mr. C. E. Low.—Q. If you admit industrial alcohol free of duty, that would mean the ruin of the existing Indian manufacturers of alcohol?—*A.* We get into a better industry.

Q. I understand that in Java they are able to produce industrial alcohol at twelve annas, and I do not think that anybody in India makes it for less than one rupee, and although the duty is not designed to be protective, it works out to be so in practice. If it were taken off the competition which the Indian manufacturer of industrial alcohol would have to submit to would be exceedingly severe?—*A.* I should think that if we get on to a better industry the people would be prepared to forego the manufacturing of alcohol at these rates.

WITNESS No. 154.

Mr. V. D. Kolte, Pleader, Bhandara, Central Provinces.

Written Evidence.

I am an humble co-operator and secretary of the co-operative district bank, Bhandara, Central Provinces.

Generally speaking it is very difficult to get financial aid to start any industries, because the public are very suspicious about the success of any enterprise. Secondly, the lack of expert hands to carry on the enterprise is, in my opinion, a drawback for getting financial aid from the public.

In such cases Government can help industrial enterprises by giving guaranteed dividends for a limited period, supplying machinery and plant on the hire-purchase system, and giving a guarantee that the Government shall purchase the products for limited periods. But, at the same time, if they assist the enterprise, they should not leave it in the hands of the directors entirely, but should keep some control over the working of the enterprise. That can safely be done by appointing Government experts to inspect the working of the enterprise, so long the enterprise is not firmly established.

Banks should be established in all the central towns of the province. When the bank was started in Bhandara efforts were made to assist the local weavers by forming co-operative societies of unlimited liability and advancing money to them from the bank. The bank felt much difficulty in forming any industrial societies on the unlimited liability system, but our efforts were crowned with success and we formed 11 such industrial societies in the district. The number of members in each society was 10 to 15, and they were asked to return the money by instalments of four months each. These weavers used to weave the bordered silk cloth generally worn by Brahmins and cultivators in Berar and Maratha-knowing districts of Central Provinces. They generally depended for the yarn on the local traders, and on investigation we found that the local traders used to take double profits from the weavers. The yarn and silk were advanced to them on condition that the cloth prepared from it should be sold to that firm alone and none else.

**Co-operative
banks and societies.**

Hence the firms used to get double profit on the yarn and silk. This is called "gutta system" in the district. The bank tried its best to stop the gutta system, but they met with failures, first, because the local traders could not purchase the articles prepared by the societies, and secondly, because the societies could not get yarn and silk on credit in the market except from the local traders. To meet this contingency, the bank corresponded with the Empress Mills and obtained a concession for yarn. Thereupon the bank opened a yarn shop in Bhandara, but the difficulty again arose about the purchase of cloth and thus the bank could not meet with success without investing the money in the purchase of cloth for which there is no sale throughout the year. If the bank would have done this, the bank money would have remained idle and it would have met with loss ultimately.

A third difficulty arose in the meanwhile, and that was of dyeing. The societies continued to work for four years, but owing to the war dyes became very dear, and the weavers who depended upon German dye could not make any profit on the cloth turned out by them. Then they increased the prices, but there was no market for the cloth. Then earnest efforts were made with a request to the Government that they should assist the bank in financing the shop, but Government replied that they were unable to do anything. Local money was subscribed, and for some time the weavers continued to work, but crises came and in 1915 the weavers had to close their looms and go on labour.

The causes which lead to the failure are these :—

- (1) The weavers could not weave cloth of daily use on the looms.
- (2) They were accustomed to work on their looms which required more time to finish the cloth.
- (3) They could not compete with the mill industry.
- (4) The crisis due to the war.

All these would have been avoided if we could have trained the weavers on the improved hand-looms and if we could have taught them to produce cloth of common-day use.

These societies are not working now, and the bank has to recover Rs. 7,000 from them.

The bank had tackled the brass workers in the town whose population is 3,000 to 4,000, but the bank did not obtain any success for the simple reason that we could not teach them the method of getting more profits within a short interval. The Headmaster of the School of Handicrafts had been here to demonstrate the brass-working machine, but want of capital came in the way. The working capital required was Rs. 10,000 to start with, and people would not come forward unless their dividend was guaranteed by Government and business was in the hands of experts. There was at the same time another difficulty, that is, of obtaining brass sheets. To start a factory of preparing brass sheets would cost one million, and unless the Government promises and works out the factory for some time with profit local money would not be invested in the concern.

There are many industries which can be carried on through the co-operative system :—

- (a) Glass working on a small scale and preparing bangles, etc., these articles being of every-day use among all Hindus and Mohamedans in India.
- (b) Hosiery.
- (c) Match factory.
- (d) Toy preparations.
- (e) Boot-making.
- (f) Lac preparation.
- (g) Button preparation.
- (h) Cement factory.
- (i) Weaving.

The organization of these societies has been already fixed by Co-operative Credit Societies Act, II of 1914.

The special object of these societies should be to spread the knowledge of the industry and to educate the people in conducting the concerns.

They should not look to profit only, but also should work so as to be of industrial value to the public in general. In fostering these industries one thing should not be forgotten, that is, the keen competition in the market; articles of the like sort are pouring into the country from all sides, and unless the Government is inclined to impose a tariff duty on the articles imported in India, there is no prospect for the cottage or local industries. This is the first step, in my opinion, which the Government should take, because it has been now found out that unless there is any such prohibitive duty, it is not possible to improve the local industries.

There are so many industries which can be started in India and for which there is no dearth of raw materials that, if proper assistance is given, the Indian market will be flooded with Indian-made goods.

For this purpose an industrial survey is very essential and early steps should be taken to establish an information bureau and advisory board with a research institution attached to it.

Commercial museums would be a great step in advance, because they will open the market readily for the articles for which there is no sale. Secondly, before we open commercial museums it is essential to appoint trade representatives in all trade centres of the world to represent India and give such information as would conduce to the advancement of the industry.

As regards the qualifications of these trade representatives, I think they should be practically commercial men, and not holders of any degree or diploma.

At the same time Government should publish from time to time the list of foreign articles which are introduced in India and which are bought by it for its use.

In this province there is a Director of Industries with an Advisory Board to deal with industrial problems. The important point to be noticed in this connection is the appointment of an Indian Civil Service man as the Director of Industries, a position which is anomalous. The post should be occupied by a person who is versed in commerce and industries.

This Board serves no purpose, so long it has got no executive powers with certain funds to carry out its proposals. The public are very thankful to the Hon'ble the Chief Commissioner in creating an Advisory Board in the province to assist the Director of Industries. As regards the relationship between the Director of Industries and the Board of Industries, I should like to have the Director as the President of the Board.

In connection with trade journals, I think the information contained therein is valuable and efforts should be made to make them more popular by translating them in the vernaculars.

The youth of the province should be educated in technical schools and the schools should be under the control of the Director of Industries.

NOTE.—Witness did not give oral evidence.

JUBBULPORE.

WITNESS NO. 155.

Mr. C. G. Leftwich, I.C.S., Director of Agriculture and Industries, Central Provinces.

Written Evidence.

NOTE.—These replies embody my personal views and do not represent the views of Government in these provinces.

It is hardly necessary for me to expatiate upon the theme of agriculture being by far the most important industry in the Central Provinces. While our land revenue alone runs into crores of rupees, at the present time in the Central Provinces there are only 28 joint stock companies with a paid-up capital of Rs. 45,50,000 or a little over £300,000 sterling. In the nature of things I have very little experience of large industrial concerns, and I am inclined to think that, provided Government disseminates all important information it can acquire bearing on the possibilities of large industries, it will probably be better to leave development to private or corporate enterprise. The matter stands on a very different footing in the matter of smaller industries, especially cottage industries. In England, the carpenter, plumber, tinker and cobbler survive and are likely to. We can do a very great deal to help cottage industries in the Central Provinces without creating Lancashire conditions. Personally, I would infinitely prefer to improve the standard of work and conditions of life of our weavers and artisans and enable them to stand up against power factories than to establish new Boltons and Wigans. Anyhow, there is the population factor. If we create by artificial means (that is not leaving it to the slow working economic laws) a lot of new industries calling for labour, we shall make it all the more difficult for our existing industries, in particular for our staple industry of agriculture. In my reply to question 5, I have indicated a *laissez aller* attitude, but this does not apply to cottage industries. I believe that we are already doing sound work, and I am convinced that there is enormous room for expansion of work on those lines. Our energies are limited by financial stress and the need for a great many more experts. By the latter I do not only mean Europe-trained experts, but include Indians working under them or

with them as instructors and demonstrators. There is undoubtedly scope for a fairly considerable development of small factories, and there is some slight inclination on the part of private persons to try their hand in developing these with Government assistance. Hitherto, I have not been inclined to do very much, as I have not yet been approached by men who could give the new venture their whole undivided attention or engage experts who will. In the past, already some of our industries have suffered from want of concentration. There are industries, at Jubbulpore for instance, which are unfortunately not thriving as they should, the principal director being very much taken up with other business concerns. One factory which failed in Berar was controlled by a lawyer. A small cutlery factory at Khandwa is controlled by a Brahmin who, in addition to his special training at Sheffield, has also qualified as a lawyer and thinks of supplementing his income from the factory by practice at the bar. I am convinced that for an Indian to make a good thing of any business, he must be prepared to give up legal practice and still more political activity.

Financial aid to industrial enterprises.

Capital,

Q. 3.—As Deputy Commissioner of Nimar, which is one of the important cotton-growing districts of the provinces, I had reason to remark that every year a certain number of ginning factories were lying idle. The pioneer factories in this district made such large profits that numbers of rich individuals or groups of men with savings to invest ran up more factories than were actually required to deal with the amount of cotton coming into the local markets. When this was discovered, cut-throat competition in rates set in. This naturally led to combines of factory-owners at important centres. These associations more or less map out at the beginning of the season which factories shall work, and allocate shares of profit. Seeing this, one ingenious gentleman built and fully equipped a factory at Khandwa, which, I believe, I am correct in stating, has never run for a single day since it was completed a good many years ago now. Yet I understand that the proprietor has been able to make quite good profits on his investment merely by the terms he was able to dictate to the combine. I believe similar wasteful investment has been made in other parts where cotton is extensively grown.

Government assistance.

Q. 4.—I have had no experience except so far as Government aid was given on more than one occasion to weaving communities in order to relieve distress. This was not ordinary famine relief, but was specially devised in order to keep these skilled workers at their own trade rather than let them scatter in search of employment or destroy their skill by taking up heavy unskilled labour.

Q. 5.—Speaking generally, I may say that I am no advocate of Government aid, either to existing or to new industries, in any form whatever. But that is purely personal, and I recognise the difficulty of applying *laissez aller* doctrines to Indian conditions. Having taken a parental line in most of our relations with the people, we cannot entirely drop it in their industrial concerns. Coming to the specific methods suggested for giving Government aid to existing or new industries, I am bound to say that my already indicated bias does not permit me to recommend methods which seem intrinsically bad in principle such as (1) and (2). I admit, however, that action taken by another Government may render some such action necessary in practice as a protective measure. Before taking such a line, it would be necessary to ascertain, with great care, the extent to which the foreign Government has aided or subsidized various trades.

Methods (3) and (4) would be less vicious economically, especially (4). Even in the case of (4), I doubt whether Government should advance a loan to any particular enterprise, not at any rate without interest. In a backward province like this, however, though there is probably quite a considerable amount of private capital available for investment in industrial enterprise, our private capitalists are still mostly very shy. Possibly, the Local Government could tap this private capital, if allowed to float a public loan for industrial purposes and utilise the proceeds to make advances for, or take shares in, new enterprises; but this is probably not sound finance and trenches on the question raised in No. 10 below. As regards (5), I am again doubtful whether in these provinces, at any rate, Government is sufficiently equipped, or has any prospect of being so equipped in the near future, as to enable it to undertake to procure and hire out or sell, on the hire-purchase system, machinery and plant, unless of the very simplest character. Even as it is, we do actually arrange for agriculturists to obtain machinery from big firms in the presidency towns for agricultural purposes, and in a good many cases such agriculturists have been helped with Government takavi loans. The general arrangement is that such a loan is recommended by the Department of Agriculture and, if granted by the Revenue authorities, is paid over to an engineering firm for the supply of machinery recommended by us. I am bound to say that our experience of this business has not been wholly successful.

(6) is a method which I think is justifiable in a backward province like ours.

(7) I would not advocate this, though patronage by Government in purchasing articles really required by it is a very useful and justifiable form of assistance.

General.—There is one way in which Government can undoubtedly aid the spread of industrialism in these provinces. Generally speaking, the commercial spirit is almost non-existent, though it has begun to develop in some centres of industrial activity. One way of spreading this spirit would be to open up the country by improving communications of all sorts. As a district officer I have always been convinced that the inhabitants of a backward tract are very much more rapidly educated and waked up generally by joining them up with centres of material and intellectual activity, than by setting down any number of schools and leaving the people to educate themselves therein. A glance at a map of any country will always indicate its most important centres of industrial activity by a congeries of roads, railways and canals. Whether the conversion of a sleepy hollow into a beehive of activity adds to the sum total of human happiness is another matter. Another way in which Government aid can perhaps suitably be given would be to go bail for, *i. e.*, to give security to central co-operative banks making advances to industrial co-operative societies. I believe our Registrar is loath to allow such advances on account of the bad security which the societies can afford to the central banks.

Q. 6.—Again, I am up against my doctrinaire principle. It seems to me an A B C of economics that Government assistance should never involve Government interference, that is to say, no more interference than is found necessary in all cases, such as the application of company laws. If Government decides to help an enterprise, it should set an example of confidence to the public when making its investment, and this probably is the form of aid I would be most inclined to ask for in these provinces. Given a group of capitalists ready to venture their small savings in what appears to be a sound industrial enterprise, I might ask Government to put down the balance still required to set it going: but in that case I would ask for it unconditionally except on the same terms as any private investor. We might incur some losses, but, on the other hand, if these were not great, they would probably be good investments in educating public confidence and spreading a commercial spirit. I would not be in favour of a Government representative on the Board of Directors. I believe a good many concerns have been killed in India by constant interference from the Board of Directors or even from shareholders. We have an example in these provinces now of a sick enterprise whose only ailment is such constant interference. At the same time, it is doubtful if public confidence could be secured by mere investment of Government money: the feeling might be that "if Government is so foolish as to risk its money it can afford to lose and won't feel the loss: we can't." The investors would probably prefer the guarantee accorded by some form of Government control. Under the company law every joint stock company must engage an auditor recognized by Government. If it fails to do so, any shareholder can come to Government to appoint one. If Government take shares it might be on the condition that Government nominates the auditor. This ought to give a feeling of security to other investors.

Qs. 7 and 8.—I have no experience of Government pioneer factories. I was recently consulted by the Local Administration about a proposal emanating from Bangalore that we should join in subscribing to a pioneer oil pressing factory. I gave reasons for advising the Central Provinces Government to have nothing to do with it. A pioneer factory run by Government is a tempting proposition in a backward province like ours, but it would be a dangerous experiment without the aid of an expert for each particular trade attempted, and given the expert I am rather doubtful of the need for the pioneer factory. For instance, I had been rather longing to get a leather tanning factory started in view of the enormous number of hides exported from these provinces; but to do so we should want an expert tanner, and I find that a man already engaged in hide business at Kamptee would be only too ready to set up a tanning factory, provided Government help him with expert advice from time to time. On the whole, I would be inclined to think experts can be better employed advising private investors than in running factories for Government.

Pioneer factories.

Q. 13.—I have no very clear views on the subject except that Government aid in any form should never be in the least bit secret. It should be absolutely open and known to the public, for after all it is the public whose money is being utilized. Perhaps, an additional precaution might be taken by notifying beforehand the intention of Government to grant aid in a particular case and inviting objections. This, in effect, is what actually occurs when the Financial Budget comes under discussion in the Legislative Council.

Limits of Government assistance.

Q. 14.—If the established external trade is of enemy origin, then by all means slay it, and let there be no limit to Government aid in doing so.

Technical aid to industries.

Q. 15.—Two years ago the Central Provinces procured the services of a textile expert to improve the cottage industry of hand-loom weaving. As Mr. Wight is being examined as a witness, I leave him to tell his own tale.

Qs. 19 and 20.—I would like to see demonstration factories run by Government of tanning leather, brass and aluminium work, on the lines suggested by Mr. Cove, and wheel-making. I have talked to the managers of pottery works on the subject of glazed crockery, but do not find them enthusiastic. A great deal of imported cheap crockery is sold even in the remotest country districts, and I feel sure there would be a great

Demonstration factories.

demand for large glazedware household utensils, such as those hawked about the country in England by gypsies. At present, our pottery works make good profits out of drain pipes, tiles and fire-bricks. They have not the time nor inclination to take up a side-show like household crockery, but I am convinced there is money in it, and it may rest with Government to demonstrate that this is the case. In all these cases, however, we can do nothing without the services of experts. Our hands are therefore tied for the present.

Surveys for industrial purposes.

Qs. 25, 26 and 27.—The provinces have already been fairly well surveyed as regards their available resources—agricultural, forest and mineral. I doubt if there is any need for Government to take up further survey for such important minerals as iron, coal, manganese and bauxite. All of these are found in large quantities in the provinces, and their existence is well known to the commercial public. Our knowledge in fact is already ahead of our machinery for utilizing these available raw materials. The same remark applies to our forest produce—timber, fuel, lac, myrabolams and mahua fruit: not to mention barks containing materials for tanning purposes. For their exploitation to the full we require in the first place population and in the second place communications.

Assistance in marketing products.

Commercial museums.

Qs. 28 and 29.—Beyond visiting the commercial museum at Calcutta just before it was opened, I have no experience. I would be inclined to think that a museum on similar lines in the Central Provinces would have very little effect on the development of industrialism. It would also be very difficult to keep one up-to-date. Prices, for instance, would be constantly fluctuating, and any one relying upon information obtainable at such a museum might very easily be well let in.

Trade representatives.

Qs. 34 and 35.—I regret I have not had time to study the question. But I consider that my reply to question 36 would probably apply with equal force to 34 in regard to India generally. India supplies raw materials of great importance to the Empire, such as manganese from the Central Provinces and wool from Burma. It is of great importance that these raw materials should be conserved for Imperial needs in the first instance. I believe that at the present time there is not enough competition among buyers of our raw materials to enable the producers to procure anything like what they should as their share of the world value. Also middlemen take enormous agency charges. We badly want to develop closer touch between our producers and the world's markets. This seems to indicate the need of trade representatives in Great Britain, the Colonies and foreign countries, but I have no such experience as to enable me to suggest what should be the qualifications and duties of such representatives.

Q. 36.—I doubt if the Central Provinces are sufficiently developed industrially to require any special trade representative at present. But I can imagine that, after the war when enemy countries will be leaving no stone unturned to recover lost ground in various trades, it might be well to help our comparatively ignorant local dealers to evade the clutches of German agents, in particular at Calcutta, in regard to manganese, hides, myrabolams and lac. A whole-time representative for each of these trades from the Central Provinces and Berar alone would necessarily be idle most of the year; but I imagine it would be possible for us to share the services of a trade representative, and if he be a man of sufficient intelligence and education, I do not see why he could not look after all four trades at once. He would not necessarily have to be an expert in any one of them. He should occasionally come up to these provinces to keep the Administration informed of matters coming within his experience through the local Director of Industries, and also to keep himself personally known to, and thereby retain the confidence of, our local dealers. In the first instance, I think it would be a good thing if he were an Englishman (used in its widest sense).

Government patronage.

Q. 37.—As I have no great faith in a commercial museum for the Central Provinces at present, I would advocate such lists of articles being supplied to the local Director who ought to know of the existence of any concern in the provinces capable of turning out articles required by the various Government departments.

Q. 38.—On the whole, I have found the present rules satisfactory in their working, but it is possible that I may have sub-consciously evaded them on occasion. I have recently succeeded in procuring orders for desk-knives and daftri's scissors required in Government offices and courts of the Central Provinces and Berar for a cutlery concern at Khandwa, and though it was not achieved by a stroke of the pen, I am bound to admit that the Controller of Stationery, instead of taking up a difficult departmental attitude, went out of his way to make helpful suggestions how this could be done. I admit, however, that an officer of a different type holding that appointment might easily have made the deal impossible.

Other forms of Government aid to industries.

Supply of Government-owned raw materials.

Q. 40.—I am not quite sure that I understand the trend of the question. On the whole, I am in favour of all concessions for the supply of raw materials being subject to public auction or tender, which is the principle followed by the Forest Department in these provinces. The same principle is applied in the case of Government quarries.

It would be necessary to provide that only approved persons are allowed to bid or tender, and a close watch will have to be kept in order to prevent enemy agents getting control of important supplies of raw materials. Ordinarily, I consider that the transaction should be kept on a strictly commercial basis. The optimum rate for Government to take would be the maximum which the concessionaire can afford to pay for the raw material in order to run his concession at a reasonable profit. If the rate be distinctly below this, then Government will be unnecessarily sacrificing revenue, while possibly rival concerns will have a just cause for complaint. When the terms are settled Government should be careful to see that there is very little, if any, reasonable ground for such complaint. This sounds easy in theory, but in practice the fixation of rates must always be a very difficult matter.

Q. 41.—Under the Tenancy Act in force in the Central Provinces, any tenant who diverts his land to a non-agricultural purpose is liable to ejectment by the landlord. With the exception of the absolute-occupancy tenants, who hold a comparatively small area of land, no tenant has the right of transfer, and any transfer made by a tenant, unless to an heir, can be set aside on application by the landlord or the tenant's heir. These restrictions made it practically impossible to obtain any tenant land for an industrial purpose, and cases of difficulty in developing industries have arisen owing to this cause. The Gokuldass Mills at Jubbulpore some years ago wished to secure land for the extension of their premises or rather to establish a village for their operatives to reside in. The land was tenancy land so they were unable to secure it by private treaty owing to the law, and the proposal was dropped. Another difficulty that has arisen under the Tenancy Law is a decision of the Additional Judicial Commissioner that a tenant who grows palas trees for the propagation of lac is liable to ejectment by the landlord for diverting the land to non-agricultural purposes. Further, that any lac propagated on trees growing on the tenant's land is the property of the landlord and not of the tenant. The Tenancy Act will shortly come under amendment and these two points can then be dealt with. As regards the first, the best solution will be to allow of transfers or surrenders of holdings for non-agricultural purposes with the sanction of the Deputy Commissioner. As a matter of fact, this has not been provided for in the Bill framed to amend the Tenancy Act. Anyhow safeguards would have to be sought and the law providing for them made most stringent. If unrestricted transfer were permitted, it would be possible to make any transfer under the cover of the law, and the policy of Government in keeping the agriculturists on the land would be defeated. In Berar the difficulty has not arisen. A ryot has there the power to transfer his holding. Generally industrialists do not understand our tenancy laws and are suspicious of leasehold rights. They want a freehold. Therefore we should make it possible for a landlord to transfer some of his own land (or take a surrender of part or whole of a tenant's holding and give it out) in proprietary right for industrial purposes, with the permission of the Deputy Commissioner, who should be authorized to declare the land so transferred there and then as a malik-makbuza holding. The second point is dealt with by defining "agricultural purposes" so as to include the objects excluded by this decision of the Additional Judicial Commissioner.

Land policy.

Q. 42.—The area of Government land in these provinces is comparatively small, and the rent charged for Nazul land at industrial centres where Government land is available is so low that it seldom, if ever, acts adversely to the industry, whether it be new or an existing one. I doubt whether any special concessions in the case of land are necessary, and the most I would recommend is power to exempt a concession from rent for a term of five years.

Q. 43.—Two cases have come before the Administration in which the Land Acquisition Act did not enable Government to help an industrial concern. One was the case of the Gokuldass Mills already alluded to, and the other the case of the Burhanpur Tapti Mills. In the first case, though the tenants were willing to sell, the land could not be acquired under the Land Acquisition Act and a valid title secured, because it could not be stated that the work was likely to prove useful to the public [Section 40 (1) (b)], or on what terms the public should be allowed to use it [Section 41 (5)]. The company therefore failed to secure the land needed. In the case of the mills at Burhanpur, the land required lay in a ryotwari village and, as in the case of the Jubbulpore Mills, Government could not use the Land Acquisition Act. As landlord, however, it arranged for the relinquishment of the land by individual ryots, compensation being paid by the company; but two holders whose land lay in the middle of the area and whose land was therefore essential stood out for absurd prices which the company was compelled to pay. The question whether compulsory acquisition of land in the interests of a purely private concern should be allowed is one which must depend on the nature of the concern, and the general principle which I recommend is that such acquisition should only be permitted in very rare cases. A pioneer industry might be a valuable development which would benefit the general population of a tract so much as to justify the harm done to the individual, and in such case it might be justifiable to force the owner or tenant to sell his land. This could be secured by removing section 41 (5) from the Land Acquisition Act.

Training of labour and supervision.

Qs. 44 to 55.—I have no experience of the internal working of any industry, but in these provinces there are two experts employed in the Department of Industries: one for textile and the other for handicrafts. There is an Engineering School under the Department of Education, and Mr. Green, the Assistant, who has charge of the practical training of the engineering students, has been cited as a witness along with the two experts of the Department of Industries. As regards question 47, though absolutely convinced that advantages will follow from the establishment of industrial schools if run on lines similar to that of our School of Handicrafts at Nagpur, yet I have not had time to observe any specific advantages as yet. I would mention, however, in case Mr. Cove forgets it, that already artisans out in the districts, having seen the tools employed and the workmanship turned out by some of our passed students, have been stimulated to endeavour to follow their lead, and have actually come to ask how they can obtain sets of such tools for themselves. We are making arrangements to keep improved carpentry and smithy tools at a depôt attached to our School of Handicrafts similar to the agricultural implement depôts kept at our farms. As regards question 51, I am inclined to think that our training of supervisors and managers is at present too theoretical, and we do not lay enough stress upon shop practice.

Mechanica
engineers.

Q. 54.—The Local Administration has had a good deal of correspondence with the Bombay Government on the subject of engineer's certificates. Mr. Westmorland is giving evidence on this subject. I have only to add that we are waiting upon the pleasure of the Bombay Government who have promised to take the question up after passing fresh legislation.

General official administration and organisation.

Q. 56.—The Department of Industries shares one Director with the Department of Agriculture. He is assisted by an Advisory Board. My only criticism of this organisation is that the direction of industrial education and enquiry in these provinces has now reached a stage of development at which it can monopolise the whole time of one Director, and certainly the Department of Agriculture demands the separation of these two-fold duties.

Qs. 57 to 59.—For the present I consider that the Board of Industries in these provinces should be merely advisory and should not have executive powers with budgeted funds. My reason for this is that the Board consists of a number of gentlemen who have a great deal of other business to look after, and I think I can safely say that not one of them could possibly give his undivided or even a large proportion of his attention to administration of the department. From my experience of two years' connection with control over budgeted funds of the department, I can assert that it would be intolerable if the Director were required to call a meeting of the Board and take a resolution from them every time he proposes to approve some new form of expenditure or some change in or departure from the allocation of funds already approved. The Industrial Board in these provinces is still in its infancy and we have yet to see into what it will grow up.

Q. 60.—I think there should be a whole-time Director of Industrial Education and Enquiry for the Central Provinces and Berar. I would be very glad if the title of this office could be changed. The present title is suggestive of that arrogant cocksureness with which we civilians are already fairly frequently charged by non-officials and officials of other departments. One can see objections to each of the classes suggested in the question. Taking them in the order given, the appointment of a businessman would be open to the criticism that no successful man of business would look at the job on the pay which Government can afford to offer. This does not follow. He might be a very capable businessman with plenty of administrative ability, but lacking the disposition of a thruster necessary for personal success. Also, the criticism would not apply perhaps to a man who might have served others quite capably in the management of some business, but who could never start his own concern from lack of capital. Another possible criticism of the businessman might be that he would be one-sided or biased. This might possibly be set right if the appointment were for a limited period of say five years. In the Central Provinces, for instance, supposing a successful manager of a tanning concern on modern lines were appointed Director, his particular bias would be of great value to the provinces. On the expiry of his term we might obtain the services of one well up in some other line of business of which there is promise for development in the Central Provinces. But it is very doubtful if we could hope to get good men to take up such an appointment in an Indian province for at most five years. To what could it lead for the individual himself? Again, it is possible that a business man, when it comes to him to advise Government in regard to a pioneer factory, for instance, might be tempted to indulge in venturesome plunges which were denied him as a private manager owing to lack of capital or the greater need for caution.

I come now to the non-expert official and my remarks will naturally refer chiefly to the Indian civilian. I can say at once that an ordinary civilian Director of Industries cannot hope, at any rate till he has been years in his job, to secure the confidence of industrialists generally and more particularly of intending investors. I believe that they will always much more readily confide in a man with personal experience of business management. Personally, I do not fully accept the general view that a civilian cannot also be a man of business. It will depend on the individual and the particular lines of his official experience. I can imagine individual officers of wide district experience who could well be regarded as men of business. Even so no civilian can hope to be given at once the confidence of industrialists and commercial men. Again, when it comes to the development of pioneer industries, the civilian would probably be most anxious to get the whole concern turned out complete in every detail of its equipment and organisation at once. He might delay the start and so perhaps miss opportunities, and would be inclined to make the whole thing perhaps more costly than it need be, instead of starting, like miners striking a new vein of ore, with rough shanties and rude implements. The extensive buildings with an elaborate plant and specialists in charge of each branch of a fully equipped mine are reached gradually, and so, I think, it should be with pioneer factories.

Some, though not all, of the criticisms indicated above for a business man would apply also to the appointment of an expert. As suggested by me in the case of a businessman, so with an expert the danger of bias would not be serious, provided the appointment is for not more than, say, five years. If the appointment could be made sufficiently attractive and one which it is understood must be held for some five years at least, then I can imagine it would be very well filled by a selected civilian of extensive district experience who has been given a year's training in business method. He might be sent to work for three months in the offices of Messrs. Tata and Sons, if they were ready to accept what little service he could render and let him see the inner working of their management. He might then, say, spend three months in Cawnpore attached to the Director of Industries there, and finally be sent for six months to Europe or America to study particular lines of business likely to develop in his province in India. I am sure that a Director for these provinces would learn a great deal if he were to spend a few weeks at each in Madras, Cawnpore, Bombay and Calcutta and then at Marseilles, in London, Staffordshire and in Lancashire. The danger, of course, would be that he might, at the end of this year, imagine himself capable of taking rank with experts in every branch of industry looked into by him.

As a matter of fact, I doubt if a civilian Director really requires such personal training so long as there are experts available for him to have recourse to. My own brief experience shows that a civilian Director recognizing his own limitations will never seek in vain for advice and assistance from experts or business men, however busy they may be. Big men of commerce could never take on a whole-time job as Director, but they are most public-spirited in the way they will help and advise an inexperienced official who knows himself for such and who is doing his best.

Q. 61.—As indicated above, I consider that the Board should be advisory only. The Director should be the provincial Government's adviser in details, but his advice should ordinarily be given after consulting and weighing the opinions of other members of the Board. When the Local Government calls for information on matters of fact, it will not always be possible for the Director to consult the Board as a whole or every member of it. The Local Government could generally indicate cases in which it desires to have the opinions of the whole Board.

Q. 62.—Ultimately, undoubtedly, we shall want an Imperial Department, but I am not sure that we are ready for one yet. We do not yet know enough to formulate the constitution of such a department, and the general control of the Government of India in the Commerce and Industry Department seems sufficient at present. When such a department does come, its head should serve as a central referee and adviser and should also be responsible for the prevention of waste of energy and funds.

Government organisation for the collection and distribution of commercial intelligence.

Q. 82.—When I have occasionally had reason to consult statistics published by the Director of Statistics, it has generally struck me that they are rather antiquated and it is not easy to get statistics anything approaching up-to-dateness, I am aware that this criticism is probably superficial and that it will be impossible to publish the statistics earlier.

Statistics.

Q. 83.—My experience is small, but I have already had fairly frequent correspondence with the Director-General of Commercial Intelligence demi-officially.

Commercial intelligence.

Q. 84.—I have not infrequently made use of information contained in the Indian Trade Journal and have more than once been stimulated to institute enquiries on reading suggestive articles in the journal.

Industrial and trade journals.

Qs. 85 and 86.—I am doubtful if this is the duty of Government, but my experience is nil.

*Other forms of Government action and organisation.***Hydro-electric power surveys.**

Q. 102.—In 1905, the Government of India suggested to Local Governments that lists should be prepared of localities where it is thought possible that hydraulic power is available for the generation of electric energy. Lists were prepared by officers of the Public Works Department, and 200 copies were printed giving details of 17 places in the Central Provinces and 9 in Berar which the local officers considered *prima facie* suitable. In the heading of this list it was written: "it must be remembered that these officers have no special experience of electric installations and that the Government accepts no responsibility for the accuracy of any statements in the list. It is believed, however, that the list may be of service to persons interested in electric schemes, and copies will be supplied to private enquirers. Such persons must satisfy themselves as to the actual facts at any site at which they may think of prospecting. No enquiry has been made as to the possibility of acquiring the land, etc., required or regarding the cost of such acquisition." In 1906, the Superintending Engineer reported that the Nerbudda Falls at the Marble Rocks, 12 miles from Jubbulpore, had been examined and found unsuitable for supplying power to the Gun Carriage Factory. In 1910, an Executive Engineer was placed on special duty to investigate the falls at Ghatkhairi on the Pench River, 22½ miles from Nagpur, and to report on the feasibility of a scheme for the supply of electric power to the city of Nagpur from the water of that river. He found the cost of such a scheme, even when combined with an irrigation scheme, so large as to render it impracticable. But, of course, this does not necessarily mean that no power generation scheme for the supply of local power could possibly succeed at that site. In 1914, Mr. Batchelor, Deputy Commissioner of Amraoti, made proposals for generating power at the Mackenzie Falls near Chikalda, a hill station in that district. The project has not been investigated in detail by experts, as the Chief Commissioner thought the scheme was unlikely to materialise for many years to come, especially as Government would probably leave it for private capital to carry it out, if at all.

Mining and prospecting rules.

Q. 103.—I have gathered in conversation with the representative of the Central Provinces Mining Association that members of their association feel that certificates of approval under the mining rules are sometimes too liberally given by the Local Administration. I mention this because I have seen the written evidence of the mining representative, and it contains no mention of this subject. I understood from him that it was not included, as they did not wish to appear to criticise an Administration which they have always found sympathetic and helpful. I gather that they would like a more thorough enquiry to be made into the antecedents of applicants for certificates. There is probably some force in this suggestion in view of the enormous importance of manganese.

Q. 104.—Manganese is probably the only mineral of considerable Imperial importance. I doubt if there is any need to develop its extraction at public expense, though control of its disposal might possibly become necessary.

X.—General.

Qs. 110 to 113.—It seems a pity that the Central Provinces should not develop means of working up locally the products of oilseeds, myrabolams, hides, lac and mahua fruit which are available in enormous quantities and are actually exported in more or less large quantities.

Oral Evidence, 21st December 1916.

President.—Q. In reply to question 40, you say, "I am not quite sure that I understand the trend of the question. On the whole, I am in favour of all concessions for the supply of raw materials being subject to public auction or tender, which is the principle followed by the Forest Department in these provinces." Do you approve of this principle of the Forest Department selling their produce by public auction?—A. It has served us in these provinces fairly well. Until recently the big firms of the presidency towns had no connection with our forests, and the produce was all extracted by local contractors.

Q. Don't you think that a forest product, whether it is timber or whatever it is, should be subject to fixed and standard prices, just like a postage stamp sold by the post office, or mining concession?—A. Is it right for the Forest Department to make revenues in this way?

Mr. C. E. Low.—Q. There are two classes of cases: one where there are homogeneous products and the other, which constitutes most of the cases, where there are trees and products of different species, mixed up in a coupe, of very varying nature and quantity. Most of the cases are of the latter kind, aren't they?—A. Yes. There is a system of licenses also. You can buy a forest license for extracting produce. There are licensed vendors, just like post-masters, dotted about in every village near Government forests exactly on the same principle. The license vendor sells forest licenses as the post-master sells stamps, that is retail.

President.—Q. I am only dealing with the question of principle; are you in favour of this principle of getting all you can out of buyers?—A. It is very difficult otherwise to determine whether you are getting fair value for your produce.

Q. If the buyer can estimate the value, why cannot the Forest Officer estimate what is fair market value?—*A.* That is partially due to a lack of staff.

Q. A big question of principle arises here. It applies not only to forests, but also to railways. Should railways get all they can, or should they be public carriers at a fair rate? Should the forest be regarded as a public servant supplying material at a fair rate?—*A.* On the analogy of agriculture, it would be better to leave the market to determine a fair rate.

Q. You are suggesting an extension of this system. Do you want this principle followed by the Forest Department to be extended for the supply of raw material?—*A.* I suggest also tenders as well as auction.

Q. It comes to the same thing, *i. e.*, the biggest bidder. One has to think not of the direct revenue to the Forest Department, but the effect on the industries of the country. It is all very fine for a forest officer who likes to see a big return for his particular circle, but is it good for the country that this should be allowed?—*A.* Not unless there is some limitation. One can imagine that a high bid for a small portion might interfere with the businesslike disposal of a concession as a whole. One contractor might bid high for one coupe, whereas it might be more convenient to give out a number of coupes to some big firm. But in all cases Government reserves the right to refuse the highest bid or tender.

Q. Obviously from a non-substantial person?—*A.* Whatever it is.

Q. This position seems to be accepted all over the country as a habit of the Forest Department to do this, and no one seems to have challenged it. I am not satisfied that it is a thing that ought to be allowed in the interests of industrial development. It is an indirect taxation. It looks as if it would be necessary to make Forest officers their own extraction officers?—*A.* I can imagine that that would be more fair to the public generally, but at present it is a lack of staff that prevents it. They would want an enormous staff for the forests of the Central Provinces.

Q. We have heard about the question of appointing Forest engineers to do the work at present done by Forest officers in connection with the development of light railways, saw mills, ropeways, etc. Do you think it would be an advantage?—*A.* I imagine it would in these provinces where we have extensive forests with bad road connections. We would be working our forests more economically with such a service.

Q. With reference to your answer to question 41, you say, "Another difficulty that has arisen under the Tenancy Law is a decision of the Additional Judicial Commissioner that a tenant who grows palas trees for the propagation of lac is liable to ejectment by the landlord for diverting the land to non-agricultural purposes." Supposing you were growing apple trees for apples but you also made cider, you could be ejected at once?—*A.* According to his decision.

Q. Have you got no higher Court in the provinces that you could appeal to?—*A.* I am afraid not; the remedy would be to legislate.

Q. What about the Chief Commissioner; can you appeal to him?—*A.* No.

Q. If this is the interpretation put on the law, you want the law revised?—*A.* I think they are going to do so at once.

Mr. C. E. Low.—Q. Are you opposed to the principle of increasing organised industries?—*A.* No. In these provinces we have practically no experts and a very small industrial community for big industries.

Q. We might get you the experts?—*A.* Then probably you will have to get a whole-time Director.

Q. The scheme would presumably be complete, and there would be one, but are you opposed on principle to the increase of large industries; do you think it is a bad thing for the province?—*A.* Not in moderation.

Q. Don't you think it would lead to the prosperity of agriculture?—*A.* I think so, yes.

Q. You say you don't believe personally in Government aid to industries; do you believe in Government aid to agriculture?—*A.* Logically I don't, but in practice I do.

Q. I think you will probably find it rather hard to reconcile the obvious benefit that occurs to every body and to the people from Government aid to agriculture. Does it not, curious as it may seem, lead the people to more organised and more critical self-consciousness and more efficiency?—*A.* It certainly has done.

Q. Do you think that would not be the case if Government assisted industries?—*A.* Yes, I think it would naturally follow. I am only afraid of it at the present stage, our machinery being so small at present.

Q. I am not asking you to consider it with regard to the existing machinery, but with reference to suitable machinery?—*A.* Yes; what I feel is that we probably help the provinces

more markedly at present by developing cottage industries and helping them on, than by Government aid to large industries involving expert mechanical skill and business methods, etc.

Q. You say if directors of companies go into politics, they don't make a success as directors, and they therefore should not go into politics?—*A.* That is an *obiter dictum*.

Q. In England business men go into politics, men such as Chamberlain, for instance?

President.—Q. They are successful business men first.

Mr. C. E. Low.—Q. They don't let their politics spoil their business, do they?—*A.* If they had not found ready-made businesses they found at least ready-made industrial conditions. In the Central Provinces we have to build up industries. If a managing director is going to spend two-thirds of his time in politics and one-third in industries, he will not succeed.

Q. You think the conditions here necessitate a man devoting his whole attention to industries?—*A.* Yes.

President.—Q. Supposing we accept the principle, what do you want us to do?—*A.* It is only a warning to Government. I think Government should not extend its aid to a man who is not a whole-time industrialist.

Mr. C. E. Low.—Q. What is your experience of these Government loans for the purchase of small plant?—*A.* We have had some rather unfortunate experiences. A Calcutta firm are at present having to sue several men whom we recommended for the purchase of some of their plant.

Q. Government gave them the loan and they did not pay it over to the firm who supplied the plant?—*A.* Yes.

Q. Would there be any objection to taking steps to see that the money got to the firm?—*A.* We have done so now. We have advised the Revenue authorities not to give a loan, except through us, and we see that it goes in the right direction.

Q. Do you think there would be any legal difficulty about that?—*A.* There might be.

Q. What is the reason why these people do not pay up; was the machine so unsuccessful that they were not willing to?—*A.* In one case it was so. He had not got an expert driver. The firm sent their own man to fit up the plant for him. It was a case of four gins. It did not quite work up to expectations. I think in actual practice it would work only three gins, and the fourth would be kept idle. They did their best and offered favourable terms. I think the man who took the loan asked to have it decided by an actual test by an engineer sent there for the purpose. They sent their engineer, and the test was satisfactory, but he still did not pay, and they had to go to court. We should never have allowed it to be delivered, until first tested.

Q. What was the reason in the other cases? Was it simply that the fellow did not want to pay, or had he any excuses?—*A.* He found that he was not obliged to pay at once. In one case he certainly devoted his loan from Government to the payment of other debts. Then when they began to press him, he had not actually got it.

Q. Was he so much in debt as to make him an unsuitable subject for a loan?—*A.* I don't think so, seeing the present prices of cotton. He has promised to pay the instalment in February, but they want it now.

Q. Who is the authority who enquired into the man's status and position?—*A.* The enquiry was rather hurried. The recommendation was made by the Assistant Director of Agriculture. It was not verified by the Deputy Director nor by the Revenue authorities, who took it for granted that it was all right.

Q. Are there any more causes at work in connection with those difficulties, other than these two?—*A.* Not that I can think of.

Q. Generally speaking, how do you think this scheme works. Suppose you have agricultural engineers who get the plant, and can say whether the engine is of the right size, and supposing you have a careful and thorough investigation of the man's status by the Revenue authorities, do you think under those circumstances it is a desirable system to continue on a larger scale?—*A.* I do.

Q. You speak of a proposal to start a company among the Kamptee tanners. As you know, the Kamptee tanning industry is a very old industry, which has fallen on evil days. With what capital do they speak of starting, and what do they propose to make?—*A.* I did not ask them the actual extent of the business, *viz.*, how many hides they could tackle.

Q. That is rather essential in determining whether they could stand up to their rivals; did they say what kind of leather they proposed to make?—*A.* Cow hides.

Q. Made into what; chrome leather or what?—*A.* At present they do not understand chrome leather.

Q. The man does not seem to have it very clearly in his head. Supposing he did start, he might find himself considerably short of capital to tackle any proposition that would have a real chance of commercial success?—*A.* I rather doubt that, because I think tanning is a particular form of industry in which you can make a success with very small capital.

Q. Do you think that these Kamptee people would raise enough capital among them to tackle it with expert advice and guidance?—*A.* Their attempt would not be on a very large scale.

Q. How much capital, do you suppose they could get together; is it only one man or more?—*A.* There is one principal Mahomedan; he could rope in three or four others with him. I don't know quite what capital they would put up; probably from ten to twenty thousand rupees. That would not carry them very far, I am afraid.

Mr. A. Chatterton.—Q. That would be absolutely useless for chrome leather?—*A.* Another tanner has started. He is now tanning on quite a big scale, but in the same old-fashioned way with the help of a so-called expert from Madras.

Mr. C. E. Low.—Q. Where do they get their tanning materials from?—*A.* Mostly from the surrounding forests.

Q. Do you know how much cheaper they get their hides than Calcutta; do you know the freight?—*A.* No, I don't.

Q. What was the proposed oil expressing scheme from Bangalore; what did it amount to; and what was your reason for not deciding to join in?—*A.* I have got a copy of my memo. to the Local Government on the subject. (Read the following memo.) :—

"There can be no doubt that the oil business is one of very great importance to India. From the 1st of April to the 31st August in the current year India imported nearly 2 crores rupees worth of oils including tallow stearine and wax, while at the same time she exported 6½ crores worth of oil seeds. In spite of this I have great doubts whether the Central Provinces Government will be justified in joining the scheme put forward by the Indian Institute of Science. From paragraph 11 of Sir Alfred Bourne's letter * to the Government of Madras, it appears that the total cost of the buildings and plant proposed to be put down will amount to some 4 or 5 lakhs of rupees and the recurring expenditure is estimated at three-quarters of a lakh per annum. We are invited to put down three-quarters of a lakh out of hand and Rs. 9,000 a year for six years. I have not the detailed figures of the area by me at present, but from the closing words of paragraph 13 of that letter it appears that the amount we are asked to put up is roughly proportional to the area under oil seeds in the Central Provinces. From paragraphs 6 and 7 of the letter * to Madras it appears that one of the forms of experiment will be the testing of different types of machinery at present used in the trade for expressing oil to see which is most suitable to Indian conditions. Each of these sets of machinery would be of a commercial size, though there is no idea of running the central experimental factory on commercial lines. I do not know how many such types may be at present in vogue; there might easily be, say, 4 or 5. Surely it cannot be the duty of Government to purchase, set up and test each of these. In the Central Provinces we have at present three oil expressing factories, and there is not unlimited scope for numbers of such factories. Are we going to put down a lakh and a quarter in order to get some advice based on experience to be gained in the next 5 or 6 years at Bangalore, which advice may or may not be of advantage to the proprietors of three concerns or even of, say, six, concerns in the Central Provinces? Supposing one result of the experiments so conducted is to condemn the types of machinery at present owned by the Hon'ble Rao Bahadur R. N. Mudholkar and Rao Bahadur D. V. Bhagwat, what help could it be to those gentlemen? Again what is to become of the machinery purchased by the Institute and rejected after experiment as unsuitable to Indian conditions? Presumably it would be sold as scrap iron and not as suitable machinery to some unsuspecting adventurer in a new industry. The whole scheme strikes me as unwarrantably extravagant. For all the benefit that it is going to do to the Central Provinces in the early future I am sure I could put the money to better use in other ways. I would rather set up our own experimental tannery for instance.

"2. In paragraph 8 of the letter I see it stated that at present the only procedure open to the organisers of an oil pressing factory is to engage at a very high salary, as manager, a European expert who is totally unacquainted with Indian conditions. I contest the accuracy of this statement. Not one of our three oil pressing mills in the Central Provinces has a European manager. Rao Bahadur Bhagwat's mill is managed by himself as a business manager with one of his sons, fully trained as a chemist, testing and experimenting in the refinery branch, and his other son, a trained mechanical engineer, in charge of the works and machinery. I admit that such favourable conditions would not be available in every case in which a new enterprise is being organised.

"3. This may all appear very valueless destructive criticism, and I have only what may appear a feeble suggestion to set against it. My suggestion is, by all means engage an expert or possibly two experts, one for the machinery and business part and the other for the chemical part of the business. These officers should go round to all existing

* Not printed.

"oil expressing factories and refineries, find out all they can about existing conditions, offer any advice they may have to give and perhaps invite co-operation in experiment. If a particular experiment is wanted to be made, I have no doubt it will be possible to get it carried out for a consideration by the proprietors or management of some existing running concern. Bangalore is admittedly not a centre of any extensive oil seed producing area. There is no particular reason except the existence of the institute why it should be selected as the site for experimental factories of the kind contemplated. No man of commerce would ever dream of setting up an oil pressing factory there, it being neither near the source of production nor the market, and I contest that no reliable datae whatever could be obtained upon the actual cost of working, which is one of the claims made in paragraph 6 of the letter to Madras."

Q. Have you gone into the question of the disposal of the oil and oil cake from these factories?—A. I have not gone into it minutely. I have talked with them at their factories.

Q. What is the main difficulty; the disposal of the oil or cake?—A. When I was there last, it was disposal of the cake. Since then they have got enormous quantities disposed of.

Q. For what purpose?—A. It is exported home.

Q. You are no doubt aware that they export under disadvantages, apart from the question of war freights, as the oil cake deteriorates, and they get lower prices. What do you think of the prospects of getting people to use oil cake either as food or manure?—A. I think they are quite prepared to. I heard a complaint made by the Hon'ble Mr. Mudholkar that we were not giving them help. It is not strictly true. At one time we wanted cake from them, but they were getting such good prices at home, it was not a business proposition for us to take it from them. We wanted it for both manure and cattle food.

Q. Is it not the case that the cake was not used as manure?—A. Yes, it is now thoroughly established as very valuable manure for sugar cane.

Q. Not for anything else?—A. For pan.

Q. Have any steps been taken by the department to try and popularise the use of it as cattle food?—A. Yes, all our agricultural assistants and divisional superintendents are now advertising it. We mention it at our agricultural meetings and in Berar the Commissioner himself has helped us by preaching it whenever he has the chance in camp. We have done a great deal to help them. As a matter of fact, Mr. Clouston forgot to mention that in our own case we get all our oil cakes from Raipur, because the Raipur man quotes better terms.

Q. Is he better off as regards freight?—A. I have not gone into that, but I don't think it is very much. It comes over the Bengal-Nagpur Railway.

Q. What do you think of the prospects of oil cake as a cattle food in these provinces?—A. I think it certainly ought to catch on. The Agricultural Chemist is proving its value as food.

Q. Do they buy it in the form of cakes?—A. Broken cake as a rule.

Q. Is that broken small enough for cattle?—A. No, I don't think so.

Q. Don't they want some form of crusher before they can use it?—A. Yes.

Q. Has any attempt been made in that direction?—A. Mr. Clouston crushes all his own cake.

President.—Q. But if you want the cultivator to take it for his cattle, you want to put him in the way of getting a crusher?—A. The mills themselves are not doing it.

Q. Is it not part of their duty to put the stuff on the market in a form in which the ryot can buy it?—A. I don't think so. It is a matter of business not duty.

Q. Won't the cake deteriorate otherwise?—A. It might possibly, because cake does get a little mildewed on the surface.

Mr. C. E. Low.—Q. Do you think that the sale, on the lines at Cawnpore, of the products of cottage or other small industries, would be of help to them?—A. I think it certainly should. I would try it myself if I had the machinery, but I am so short-handed. I have not seen Cawnpore.

Q. If you had an agency of that sort, would you be prepared to recommend that it should be tried, i. e., simply stock the things as the agent of these people and send the money to them when you got it; or would you purchase upto the limit of an estimated demand?—A. I have not thought of that. I would prefer to start with the thing as agent. In that connection Mr. Wight, in answer to some questions, said that he considered his duty ended by showing the weavers how to produce better stuff. I don't agree with that. As a matter of fact, Mr. Wight had personal experience of selling stuff for cottage workers in Donegal,

and he ought to give us the use of his experience. I don't accept his reply in that case. I think what he felt was that he was not expected to have any special connection with co-operative societies as such.

Q. I see the experience of the co-operative society was very unfortunate; they were very badly hit by the war; in fact so much so that very large numbers of weavers were in receipt of Government help?—*A.* Yes.

Q. You say that purchasers of India's raw materials, owing to the absence of competition, don't pay enough?—*A.* I am afraid that is also an *obiter dictum*, that is my impression. For instance, in the case of lac and myrabolam and hides, our local dealers are very small men, and they are very largely in the hands of rogues in Calcutta and Bombay. Our small men in the Central Provinces are not able to look after themselves thoroughly.

Q. You don't imply that people in foreign countries, who want the stuff, do not pay a profitable price for it?—*A.* I don't mean that.

Q. Because the competition to obtain our raw materials, when the supply has been slightly narrowed owing to war restrictions, has been very, very acute. In things like the cotton and wheat trade, the export business has been cut extraordinarily fine. We will come back to your real point that there is a lot of waste, and unnecessary intermediate profits between the man who produces it here and the man who finally ships it to the ultimate buyer in foreign countries where trade is organised. Could you give us any particular instances, or state what your impression is based on. Take lac, for instance?—*A.* I cannot remember the figures.

Q. Never mind the figures. You had a reference to the lac trade. The general impression is that there is a great deal taken off by the middle man; does not the middle man undergo a lot of risk in the case of lac?—*A.* We have one case of a man who actually went bankrupt—a European.

Q. How do you think that the commercial agent for India in foreign countries would help in a matter of that sort; is it not a matter of dissemination of information up-country from Calcutta?—*A.* I did not think only of prices; there are other factors besides prices. What the producer wants is the form in which the particular product can be put on the market. That can only be determined by the man who is closely in touch with the market.

Q. You mean when a man is preparing a thing in Gondia, which will go to the U. K., it will be advantageous for him to know whether anyone else would give him a better price?—*A.* That is so. But I also mean that he should know the best form in which to export his produce, whether as shellac or stick-lac, for instance.

President.—Q. Aren't there cases of this kind, where a product might be sold for a declared purpose, so far as the public knows, and that the raw product may contain a bye-product which may be valuable, and even as valuable to the buyer as the first product. This information being concealed from the seller, the buyer is getting profits that the seller does not think of, and a trade representative in London, accompanied by technical experts to advise him, would enable India to detect cases of the kind. There are cases of bauxite being sold from Ireland for alumina, whereas one knows that the buyers are making it into alumina for the acids it contains. I should like to know whether in your opinion that is an additional reason for this trade representative in one of the big markets accompanied by technical experts to advise him as to what is being done with our raw products?—*A.* I feel sure there must be many cases of that kind in which India is suffering.

Mr. C. E. Low.—Q. Who are the members of your Industrial Board?—*A.* There are two Government nominees, besides myself; one is a representative of the Public Works Department, who is an engineering expert, Mr. Joyce, Mechanical Engineer; then there is the Director of Public Instruction, or his representative (hitherto it has always been his representative); a representative selected by the Registrar of Co-operative Societies; Sir B. D. Mehta; Hon'ble Mr. Mudholkar, and Hon'ble Rao Bahadur Kelkar.

Q. Were these last gentlemen nominated by any authority?—*A.* They were nominated by the Chief Commissioner, being selected as business men. Then there is the Hon'ble Mr. Dixit. I have not quite understood what his selection was for. I would like some more men of business, pure and simple. In response to my request for business men, the Chief Commissioner nominated Mr. Westmorland, Ralli's Agent at Shegaon.

Q. Have you ever seen an industrial survey which was of any practical use when it was made, or in which any action which was taken could not have been taken without the industrial survey?—*A.* Your own industrial survey.

Q. The industrial survey to which you allude was a survey of possible cottage industries. Do you think it likely that there is a better agency to conduct industrial surveys than those which exist at present in the Forest and Geological Departments?—*A.* No, I cannot say that I have thought there would be an improvement on them.

Hon'ble Sir R. N. Mookerjee.—Q. You are opposed to any kind of Government assistance in the development of industries, at any rate in your own province?—*A.* Not exactly.

Q. But that is what you have said here in your written statement; and you choose to use such strong language as "vicious"?—*A.* Vicious economically.

Q. From your experience do you say that, or from your imagination? —*A.* I have had experience of Government actions leading to results not expected. I think that that is the danger of Government interference. Some measure appears plain sailing. Government sails in, and results occur that were not anticipated.

Q. Then you prefer things going on as they are without any attempt to develop industries on the part of the Government?—*A.* As a personal view, yes.

Q. You are opposed to any sort of assistance by Government, but in paragraph 1 you say that you should prefer that Government should stand security for any loans given. Don't you think that that would be more risky than giving a guarantee for any limited period and asking the firm to return the money?—*A.* There is a good deal of risk in it.

Q. You are not prepared to recommend a guarantee for a limited period, but you are prepared that Government should stand security for any loan that the banks would give?—*A.* I do not very much wish that it should do so.

Q. You said that in your statement; do you want to alter that?—*A.* I would like it to stand as I realise we should do something. In the particular case of the Central Provinces so long as we have a particular man at the head of the co-operative movement, I would recommend Government security for loans advanced by co-operative banks to industrial societies. I would not like it to go in as my opinion for general application everywhere.

Q. Is your province so backward that you would like to abolish your own department?—*A.* I think in another paragraph I have strongly advocated greater activity in regard to cottage industries.

Q. You know the system of hire-purchase in regard to machinery: you are also opposed to that?—*A.* In these provinces I am.

Q. Do you know that private commercial firms always do that? There is no difficulty there. You are the Government, but ordinary private commercial firms hire or sell?—*A.* It is not the principle of hire-purchase I dislike, but that Government should purchase the machinery and then pass it on to the consumer on the hire-purchase system. It is the Government dealing which I object to, because we have no machinery in the Central Provinces for determining what is the proper or suitable machinery that we can pass on, on the hire-purchase system.

Q. I am an industrialist in your province, and want a certain machine. I have not got the money to buy same and write to you and say, "if you give me this on the hire-purchase system I would like to buy the machine and pay you in 5 or 6 years." It is my responsibility, telling you the particular machine?—*A.* I have no expert at present to advise me. I would take all the trouble to find out a business firm to whom I would refer you.

Q. But you would not help me with the sort of help I want?—*A.* I would help you with advice.

Q. That can be had any where gratis. Advice is a very cheap thing. You say you are in favour of cottage industries. Most of these industries can not get money, and this is a most innocent form of help. In the case of a loom or any other machinery, the man has not the money to buy it and he wants the machine to be sold to him on condition that he pays back the value of it gradually. That is the whole sum and substance of the hire-purchase system?—*A.* In the Central Provinces I have no expert to advise me. Supposing an expert were appointed for machinery of a particular class. He would presumably be appointed on Rs. 1,500 a month. When you ask him his advice, he is bound to give some advice. I can quite imagine that that advice in your particular case might not be of the very best, but then it would be accepted and you might be let in. Government might also be very badly let in. Government might purchase a machine which was not suited for the particular work required of it.

Q. I said the man requests the kind of machine he wants. He has not got the money. There are hundreds of people who have not got the money, and they want, say, fly-shuttles?—*A.*

President.—Q. Why should not the Government be let in?

Hon'ble Sir R. N. Mookerjee.—Q. Why do you defend Government like that? It is for the good of the country; the public wants it?—*A.* I am not quite sure that my helping you would cause the public to put up the money.

Q. It seems to me that you have not a good word to say for the director of shareholders. You do not like directors. No joint-stock company could be generally formed without directors?—*A.* I have not suggested that.

Q. You say "we might incur some losses, but, on the other hand, if these were not great they would probably be good investments in educating public confidence and spreading a commercial spirit." You also say, "I believe a good many concerns have been killed in India by constant interference from the Board of Directors, or even from shareholders?"—*A.* Yes, by *constant* interference.

Q. The directors are appointed to manage the concern. They are like your magistrate and police. How will you manage a concern?—*A.* It seems to me you have no idea of a joint-stock company. How can a joint-stock company be managed without directors?—*A.* I don't think I have suggested that. It is the *constant* interference that I object to.

President.—Q. It is only a matter of wording. We all know what Mr. Leftwich means. With interference a good manager can do nothing. The remedy is for the directors to be business men.

Hon'ble Sir R. N. Mookerjee.—Q. The idea is to help you to suggest the means by which industries can be developed.—*A.*

President.—Q. It is no use making remarks to us if you cannot act upon them?—*A.* The trend of my argument is that if Government, in putting up the money, demand the right to appoint a director, the director would be apt to interfere a great deal too much. The director would be very likely just as well intentioned and just as well informed as some of the other directors, but being a Government director would be inclined to interfere too much. I wish emphatically to contradict the suggestion that I advised "joint-stock companies without directors or shareholders".

Hon'ble Sir R. N. Mookerjee.—Q. Then as regards these civil servants as business men, if they are sent to foreign countries, to Tata's and other firms, how long do you think they would stick to the post?—*A.* It ought to be for at least 5 years.

Q. Will you be content to remain in your post after all these years of experience?—*A.* I certainly think the man should who had been given that training by Government. The appointment should be on an incremental scale of pay. We have an example in our province now in the appointment of the Inspector-General of Police. He should not be left to chance grading.

Dr. E. Hopkinson.—Q. Were you appointed to both Director of Agriculture and Director of Industries simultaneously?—*A.* Yes, the two go together.

Q. You are the first Director here, are you not?—*A.* No, Mr. Low was.

Q. You have had the means of observing what should be the natural boundary line between the two posts; do you find that the duties of the two posts are interlocked in any way?—*A.* Not at all.

Q. Take the particular instance of the ginning of cotton; do you regard that as purely a matter of agriculture or a matter of industry?—*A.* I don't quite follow; do you mean from the Government point of view?

President.—Q. Supposing the appointment were separated; which Director would make it his business to give his attention to the ginning of cotton?—*A.* The Director of Industries, because it is controlled by the factory laws, which would have to be administered by the Director of Industries.

Dr. E. Hopkinson.—Q. I suppose you would consider that particular instance as coming very near the duties of the Director of Agriculture?—*A.* Very near; the two might seem to overlap, and they do in these provinces especially.

Q. Do you think the sugar factories and the cotton ginning mills should come within the province of agriculture?—*A.* I find it difficult to give an academic opinion. I don't quite see where the Department of Agriculture is going to come into the question at all, either in the sugar factory or the ginning factory. If it is a question of Government aid, then it would be the Department of Industries. In regard to the Government inspection of factories, it would be the Director of Industries. I cannot imagine any way in which the Department of Agriculture would interfere with the working. I cannot quite see in what form the department would come in contact with the sugar factory or the ginning factory, except as an enquirer. If it was a question of giving aid, that aid would certainly have to be given by the Department of Industries.

Q. To put the question in a more general form, have you found any disadvantage in occupying the dual post?—*A.* The disadvantage is certainly that I cannot do credit to either. I would like to have a whole-time Director of Industries for the Central Provinces; the one duty certainly interferes frequently with the due performance of the other.

Q. Do you consider that industrial education should come within the province of the Director of Industries?—*A.* In its practical branch, I think it should.

Q. I hope all industrial education is practical?—*A.* I consider that industrial education should be controlled by the Director of Industries.

Q. I suppose in the Central Provinces there must be a large production of hides and kipps?—*A.* Yes, very large.

Q. Does that business come under your supervision?—*A.* Yes, I noted from the trade returns that we were exporting 40 lakhs of rupees worth of hides from these provinces in the year, and we imported ten lakhs of rupees worth of leather. That did not seem economic, and I went round to the Saugor slaughter-houses. There is a very large opening in the leather trade in Saugor. They slaughter up to 500 animals a day and about half that number in the neighbouring district of Damoh.

Q. I suppose the channels have been completely changed through which business has been done, owing to the war?—*A.* Undoubtedly. German and Austrian agents looked after many of our industries before the war. That has been eliminated now.

Q. What I want to get at is whether that sort of thing comes within the province of the Director of Industries?—*A.* It certainly should.

Q. You have not devoted attention to this feature?—*A.* I take a personal interest in it. I always jot down notes when I come across it, but at present I have no means of doing very much in the matter.

Q. Putting it in another way, we know that the trade has passed from German hands to British hands. Did the Administration think it worth while to consult you as to this transference?—*A.* They have not done so up-to-date.

Q. You are not familiar with the details of that transference which is now going on?—*A.* Except that my department held an enquiry to see whether there was any boycotting of any particular firm in the trade. There was one Ispahani who complained that he had been boycotted by the rest of the trade. We made enquiries which showed that Ispahani had practically never had any business with these provinces. My inspection of slaughter-houses was made particularly to help to frame the rules, and in the course of that I was able to pick up a great deal of information about the bye-products which show an opening for other connected trades, such as bones, glue, gut, etc.

Q. Do you consider it part of your duties as Director of Agriculture to make yourself acquainted with the result of researches carried on at Pusa?—*A.* I try to.

Q. I assume you consider that to be particularly the duty of the Deputy Director?—*A.* I consider it the duty of the Director also. He cannot follow the details, but should keep himself informed of results. In reading journals I frequently mark paragraphs and send them to the Deputy Director to ask if he had noticed them, as he is so very busy, he might miss an important article or paragraph of local bearing.

Q. We have had our attention drawn repeatedly to shortage of labour in the case of every one of the industrial undertakings. Has that come frequently before you?—*A.* Undoubtedly. It is the cry all over these provinces. Our biggest industry, manganese, is suffering from it very greatly.

Q. Can you suggest reasons for it?—*A.* It is a matter of population in these provinces. Our population is very light.

Q. Actual shortage?—*A.* Actual shortage of population. We have a lot of unpopulous tracts. Some of our industries happen to arise in unpopulous tracts. The development of Central Provinces industries has very nearly killed emigration from these provinces to Assam tea gardens.

Q. If the labour was brought up to a proper standard of efficiency, do you think it would then be sufficient in the Central Provinces?—*A.* For the present I think it probably would, but we hope to develop further. I am not sure that the population is going to increase at the same pace as the development of industries. I think if labour were efficient, at the present time it would probably be sufficient.

Q. Do you think that the need for labour might increase at a rapid rate, and there would again be a shortage which could only be met by labour from other provinces?—*A.* Yes.

President.—Q. What is going to increase the efficiency; have you got any ideas?—*A.* Industrial education must, up to a certain point. One hopes to increase it that way; even if we are not able industrially to double our effective labour, we can, at any rate, train our mates and overseers. At present most of our mates or under-foremen are practically labourers, hardly better, and many of them are illiterate.

Dr. E. Hopkinson.—Q. Do you think industrial education would do it?—*A.* No, I don't. We must educate them and stimulate ambition. As a matter of fact I disagree with Mr. Wight. He was asked whether he observed the birth of any ambition amongst the weavers after they had been introduced to the improved loom. He was unable to answer. But it is a fact that when the coarse weaver, who used only to weave a coarse type of

cloth, is once introduced to the fly-shuttle he is not content with that; he immediately asks for a dobby to weave fancy borders. That means he wishes to raise himself a whole grade, as a weaver of bordered cloths ranks a grade above the others.

Q. Were you responsible for the appointment of Mr. Wight?—*A.* Not for his selection. He was selected by the Secretary of State. He was appointed in Mr. Low's time.

Q. You are responsible for the general direction of the policy pursued?—*A.* Yes.

Q. One of the chief points of the policy which you are directing is the introduction of superior qualities of materials for handloom weaving. Is that a definite policy which you are advocating and pushing?—*A.* Not improvement in the quality of the yarn.

Q. I mean taking more valuable material like silk and wool rather than cotton?—*A.* We are trying to convert our common cotton weavers into silk and woollen weavers at the weaving centres.

Q. That conversion is going on satisfactorily?—*A.* It has only just begun. Wool weaving was unknown entirely in these provinces. There was no such thing as woollen wovens, except blankets.

Q. That is quite a definite feature of your policy?—*A.* Yes, and this encouragement of coarse weavers to take up fine work, because the coarse weavers must inevitably go under to power looms.

Q. Is much handloom weaving done by females?—*A.* None.

Q. Is there any tendency at all to increase female labour in cotton industries?—*A.* I have not seen any. They help in the sizing, spinning, dyeing, etc.

Q. Would you say the handloom industry does largely employ female labour?—*A.* Yes, in a way, for the weaver's wife does not go out to any other labour, except at certain times like the harvest.

Q. What I want to get at is, is there any unused fund of labour?—*A.* If there is then its employment would have to be in another cottage industry alongside, because they have to make the weaver's food and look after his house generally. If a woman can spare time for other duties, she sometimes helps in spinning, dyeing, etc.

Q. Is that assistance carried as far as it can, or is there still a fund to draw upon?—*A.* There is undoubtedly a large labouring population in the village who are not continuously at work, I should not think in the weaving caste there is a very large reserve.

Q. I don't think Mr. Wight told us whether you have any peripatetic classes for weaving?—*A.* Yes, we have about four teachers. Mr. Wight's Indian assistant was trained at Madras and had experience of peripatetic work. He has done quite a lot. We have introduced new fly-shuttles in villages right out in the districts. Our demonstrators sit down in a village for almost a fortnight and teach the local men to use the loom properly. When a weaver has once learned, they offer him one of the sleys on the hire-purchase system at Re. 1 a month. We have only got about fifty of them out at present, but have been held up for want of organisation for making the sleys. Once we get well started we hope to get along very quickly.

Q. In reply to question 3 you speak about a factory at Khandwa; is that a ginning factory?—*A.* Yes.

Q. But you rather suggest that that was put up almost for the purpose of blackmail and was never intended to work?—*A.* It is my firm conviction that it was.

Mr. A. Chatterton.—*Q.* Have you anything in the nature of a cattle census in the provinces?—*A.* Yes.

Q. Have you ever compared the figures of the census with the output of hides that are exported from the province at all. What I want to know is if there is any large waste of raw material through inefficient arrangements for collecting the hides?—*A.* In the particular case of our Saugor slaughter-houses the result would be vitiated by the fact that a great number of cattle are brought from the surrounding native states, trans-frontier.

Q. Can you give us a little more information about these slaughter-houses, because I understand they are an institution peculiar to the Central Provinces?—*A.* I have not gone into the birth of this industry, but I believe I am right in saying that it started with famine. A great many head of cattle were sold because the cultivators were hard up, and some astute Mahomedan contractors saw their opportunity and started a regular business. It became so considerable that they were able to offer fair prices, and it has come to stay. The principal industry is not hides but jerked meat. This is cut up into strips, dried and made into bundles like bundles of firewood, and then sent down to Calcutta for export to Rangoon and the Malay States, and some gets as far as China.

Q. Have you any idea of the value of this trade at the present time?—*A.* No, I have not asked the proprietors for any information.

Q. Have these slaughter-houses aroused any local feeling in the matter?—*A.* They have aroused local feelings of greed and not of indignation. I think you will find that many of the municipal members are shareholders in these yards. Brahmins and Hindus are also found to be shareholders, I believe.

Q. Turning to the question of oil cake, do you know whether there has been a very large extension in the use of kerosene oil in these provinces?—*A.* During my service it has been tremendous. My own personal experience is that on going out into a district one would see one hurricane lamp in ten square miles; now one or more kerosene oil lamps are used in every village.

Q. Has that led to a decreasing extraction of oil in native oil mills, and consequently a decreasing amount of oil cake available for agricultural work?—*A.* I cannot say that as a fact, I have no statistics.

Q. One would imagine that there would be great demand for oil cake in mills to make up this hiatus if it had occurred?—*A.* I have taken no census. I have no statistics for that.

Q. Has any attempt here been made to extract oil by solving processes in any of these oil mills?—*A.* I am afraid I don't know.

Q. The oil cake which is purchased by the Agricultural Department for eating purposes, is that analysed?—*A.* Some of it has been analysed by the Agricultural Chemist. It is not analysed as a regular thing before we take delivery.

Q. In your evidence you state that you are in need of a great many more experts to deal with these cottage industries; to what particular class are you referring now; do you mean European experts?—*A.* I mean expert teachers, say, for wood work, metal work, dyeing work, etc.

Q. You want good tradesmen and good craftsmen?—*A.* Yes, they must be craftsmen essentially.

Q. Would you be content to get men from other parts of India, or do you want Europeans?—*A.* No, we would be content to get men from other parts of India.

Q. In regard to the appointment of Government directors, you say that if Government put their money into anything, they should do so unconditionally, except on the same terms as any private investor. Would that not mean that Government would have the same right as a private investor to nominate or elect directors on the Board?—*A.* Yes, on the basis of a shareholder.

Q. Would you have objection to a Government director appointed in that way?—*A.* No.

Q. Then you say you would like to see demonstration factories run by Government, of tanning leather, brass and aluminium work, on the lines suggested by Mr. Cove, and wheel-making. These demonstration factories would compete with existing factories outside the state; for instance at Poona there is a large brass factory which exports to these provinces a considerable amount of brass work, and another one at Lucknow. Don't you think it would be rather unfair interference with the existing rights of these factories?—*A.* I can quite imagine it might be, and that is what I indicated as one of the possible results that would be unforeseen.

Q. Would you rather see this kind of work done under Imperial control, *i. e.*, the control of the Government of India rather than under the control of the local administration, so that a wider view might be taken of these matters?—*A.* Yes, I would like general control. I think we have already wasted time in these provinces from not having it.

Q. You state that in the case of one of these mills, the Land Acquisition Act could not be applied in connection with the acquisition of land for the erection of houses and buildings for operatives, because it was not a work that was likely to be useful to the public. Surely the erection of housing accommodation for work people is a matter of benefit to the public?—*A.* I agree. In the other case in question I was myself Deputy Commissioner of the district, and I did some special pleading to try and induce Government to bring the case within the Land Acquisition Act.

President.—Q. Who decides the interpretation of this clause of the Land Acquisition Act, which adviser of the Local Government?—*A.* The Financial Commissioner; he advises the Chief Commissioner, but probably consults first the Legal Remembrancer or Standing-Counsel.

Mr. A. Chatterton.—Q. With reference to your statement that you received a proposal from Bangalore that the Central Provinces Government should join in subscribing to a pioneer oil pressing factory, would you not like to amend that statement, as "a pioneer oil pressing

factory" is hardly accurate. The meaning of the circular sent out was to the effect that it was proposed to undertake a complete scientific investigation of the oil seeds of India, and of the possibility of working them up into products which could be utilised in the country. You seem to lay undue emphasis on the statement that some mechanical experiments were to be made as well as a large amount of chemical work?—A. I admit that I have not understood it. I took a rather one-sided view of it as a mechanical experiment with machinery.

Q. In that case would you be prepared to modify that statement with regard to the "pioneer oil pressing factory"?—A. Yes. I thought that an oil press could only be economically used on a large scale. I imagined that Government was going to set up a factory with separate sheds, each with an oil-pressing plant of different type.

Q. The main idea is chemical work; it is a subsidiary matter running various kinds of presses, and for that reason your description is inaccurate?—A. I should like to modify my view then.

President.—Q. Do you know what action the Local Government has taken?—A. The Local Government has accepted my views that it is not advisable for the present for the Central Provinces Government to come in as we want all our money for other developments. The reply of the Local Administration was that the time was unsuitable, having regard to the finances of the province.

Q. Did the letter convey any idea as to whether it was sent to the Government of India?—A. No, it came direct to our administration. It came from the Madras Government.

Q. Have you got any supplementary remarks to make?—A. I have jotted down a few points in regard to the evidence of some of the other witnesses with which I don't agree. One is that capital for local gins and presses has always been put down by Marwaris. I know many that were subscribed for by local landholders. I have also in my answer to question 103 stated that certificates of approval under the mining rules are sometimes too liberally given by the Local Administration. Since I noted on this matter of the policy of the Local Administration, I have had a letter from the Deputy Commissioner of Nagpur very strongly putting forward the same views.

Q. You say that the Local Government have been too free in granting certificates of approval?—A. That is a point brought up by the Mining Association. They say that the result has been that a certain class of jackals has arisen, who, following honest prospectors, merely try to make money.

Q. The certificate of approval expires on the 31st December of the year in which it is granted?—A. In the particular case mentioned by the Deputy Commissioner of Nagpur he refused to renew a certificate to the man who appealed. The Deputy Commissioner had to put up a very strong case to get his orders upheld. He asked in his letter for a declaration of policy by the Local Administration in regard to these matters. He has given his reasons.

Q. The mining rules so far are particularly clear. A certificate is granted readily, unless there is something definitely known against the applicant. That certificate is granted up to the 31st December. If, in the meantime, the man shows that he is an unworthy person, it is not renewed. It is only right that the officer who refuses the certificate should give his reasons. In this case the Deputy Commissioner has given satisfactory reasons, and I don't see any point to grumble in that. If he did not grant certificates of approval freely he would cause considerable delay in the granting of prospective licenses to people who are really worthy. If there is anything definite against the applicant, obviously the certificate of approval would be refused at once. I cannot see that you have established any case for the revision of the rules granting certificates of approval?—A. I think so myself. This letter only draws the attention of the Local Administration to the fact.

Q. If your Administration varies in its interpretation of these rules we cannot interfere unless you can show that the rules are so worded as to admit of unfair variations?—A. In the matter of Government loans the rule limits the loan to three times the rental value of the land. In the event of a man holding a piece of land extremely cheaply, he ought to be in a better position to take a loan, but according to our rules, he is less able to. Under the Takavi Loans Act, we are not able to give much help.

Q. Did you make definite representation on that point?—A. No, the case arose in the examination of Mr. Clouston.

Q. You are not prepared to make any recommendation on that point?—A. No.

Mr. A. Chatterton.—Q. When land is tendered as security, how do you value it?—A. Purely according to the rental assessed by Government.

Q. You don't make a valuation of the land?—A. No.

WITNESS NO. 156.

*Mr H. R. Crosthwaite, J.F., Registrar of Co-operative Societies, Central Provinces,
and Governor of the Central Provinces Federation of Co-operative Banks.*

Written Evidence.

NOTE.—Strictly speaking, it is anomalous that an official Registrar of Co-operative Societies should also be the non-official head of a co-operative banking organization. But the business of co-operation calls for special knowledge and constant study, and it is still new in India; the expert non-official co-operative worker, such as Haas of Germany, or Buffoni of Italy living for the co-operative movement and paid by it, does not yet exist in India. Hence, of necessity, the Registrar has to fill a dual rôle. Then again there is no State money in the co-operative banks of the Central Provinces. In answering the questions set by the Commission, I shall speak in my non-official capacity as a co-operative banker and organizer, except where I state clearly that I speak from the point of view of an official Registrar.

Capital.

Q. 1.—Agriculture is far and away our most important industry in the Central Provinces and Berar. 76 per cent. of the provincial population are engaged in agriculture; of the remaining quarter 3 per cent. only are engaged in the textile trades and 7 per cent. in other industries. If agricultural co-operation means so much to Germany with only 36 per cent. of her population engaged in agriculture, what ought not agricultural co-operation to mean to the Central Provinces?

For agricultural and, in a much less degree, for industrial co-operative credit I have had experience of raising capital. Thanks to the prestige of Government and to the support of a small band of non-officials, aided powerfully by officials, we have now between 50 and 60 lakhs of working capital together. Most of this has come in since 1911. In June 1913 the co-operative movement was in possession of about 3 lakhs of working capital. I am not counting any money twice over, e.g., the money of the provincial bank passed on to central banks.

As regards agricultural societies, central banks (the local non-official directors are the judges of credit) are ready enough to finance them. As regards societies of weavers, workers in bell-metal, and the like, great hesitation has always been exhibited. This was, I think, by slow degrees, turning into confidence when the War broke out. Following on the financial crisis (which produced a great contraction of *hundi* credit and knocked out many small middlemen) the effects of the War have been bad for co-operative societies of small producers. Default has been the rule, and the central banks refuse to finance these societies further until their members commence to reduce their present debts and to sell their goods at a profit. Here is the great obstacle to the success of the society of small producers. Co-operation may secure great economies in the cost of production: it cannot ensure a sale at a large enough profit. The "workers' society" is on a different footing to the society of small producers, and this type exists only under circumstances and amidst surroundings which do not exist in the Central Provinces and Berar. On the continent of Europe the society of small producers, selling independently of each other, has never met with success. A notable instance is furnished by Germany. The Prussian State Bank was founded expressly for the benefit of the small producer. Yet despite every effort on the part of Government the capital of this bank has gone to agricultural co-operation; the reasons for this are purely economic and of an ordinary business nature.

I see no prospect of finding much money for industrial co-operative societies until the movement has proceeded to a much more advanced stage of development, which I shall indicate in replying to another question.

Q. 2.—Our capital has been obtained from local sources, e.g., pensioned servants of Government, lawyers, persons still in Government service. We cannot claim to have tapped a wide field as yet, but we get more money than we can, under existing conditions, use in the province. We do not push for deposits, and we have never failed to meet our obligations to depositors. We have tried to deserve confidence, and (it must not be forgotten) there is the Government controlled audit, the Government guidance, and the Government prestige behind us.

**Government
assistance.**

Q. 5.—Take (2) and (7) together. What the cottage industries require, especially the weaving industry, is a profitable market. If Government will help us in this direction there is every prospect of success before the societies of small producers. This is really the key to the whole situation of cottage industries on a large scale co-operative basis with co-ordination of units, etc.

Q. 6.—In my opinion the driving force behind the economic activities of the co-operative movement is supplied by Government. Take that away, and co-operation will never develop into a great Indian asset. It is my belief that the driving force employed at present is insufficient, and that, in its zeal to bring out the non-official aspect of the co-operative movement, Government stands to lose time and opportunity; the policy of Government involves the danger of chilling to extinction an enthusiasm for co-operation which is, as yet, based on sentiment rather than on a knowledge of world politics. In a province as large as ours—rather larger than England, Scotland and Wales put together—with an area of almost one hundred thousand square miles, with a very imperfect

system of communications, with a population of 14 millions, of which only 33 per mille are literate, with many months in the year during which villages cannot be reached or agricultural operations keep villagers too busy to attend to anything else (such as instruction in the means to secure better farming, better business, better living)—with all these facts to encounter it is, I submit, unreasonable to expect great progress in return for an average monthly expenditure of Rs. 8,195, or less than Rs. 1 lakh a year. From non-official funds supplied by the co-operative organization I spend Rs. 6,250 a month, and this figure is mounting rapidly. Taking official and non-official expenditure together, we spent last year Rs. 1,73,365 on the organization and development of the co-operative movement, and this represents 7 per cent. on our turnover, which was Rs. 2,59,11,000. Agriculture being far and away our most important industry. Government should, in my opinion, spend more money on it and pay better organized, more systematic, and more concentrated attention to its improvement and development. There should be more and not less Government initiative and guidance and instruction, and it is wanted not at the bottom, not to carry out simple audit or to introduce red tape, but at the top. We want more men of the stamp of the Deputy Directors of Agriculture. Both in agricultural and industrial co-operative enterprises State control is essential in India. It may be difficult for the State to find apostles in numbers; but that, I am convinced, is what the State ought to try and do.

Q. 8.—I would go so far, in connection with cottage industries, as to start model societies if I had improved looms, etc., to introduce. I would select my members and start them, at first, as paid workers on wages. Then I would take them on to piece-work, and gradually steer them to their independence. This scheme depends on the provision of a profitable market. The question before Government is "Are cottage industries, as a State asset, worth saving by whole-hearted protection or not?" Short of whole-hearted protection, I can think of no measures which would give results of a satisfactory and substantial nature.

Pioneer factories.

Q. 9.—(i) Cottage industries.

(ii) The development of small scale private industries.

Financing agencies.

As regards (i), take the weaver or the dyer. As a rule his operations are conducted in a vicious circle. He is really the slave of the *mahajan* or the middleman; he borrows from these men for food, clothes, etc., when trade is slack, as it so often is (in a *Singhast* year, for example); he buys his raw material from them; he sells his finished products to them. At each stage he is bled, and his margin of profit scarcely yields a living wage. Nor does the middleman always grow affluent in the process; for he often finds it difficult to sell. The result on the industry is, in general, deterioration of quality in goods, loss of public esteem, failure to meet competition,—all the results, in fact, which follow the struggle to maintain adequate margins between the cost to the producer and the price paid by the consumer.

(ii) Take the case of a man who wants to set up a small flour mill, or even an oil engine working a ginning plant, a grinding mill, and a fodder cutter. If he works on borrowed money, money from the private lender, he will pay not less than 24 per cent. per annum, and, ten to one, there will be other conditions besides the payment of interest and repayment of principal attached to the loan. The honest lender exists; but there are very many—too many—dishonest lenders trying to get the best of dishonest clients. A higher standard of honesty is wanted and greater mutual confidence.

Q. 10.—I do not know where to begin to reply to this question. We could do much more than we are doing at present, but organization and construction take time. For instance, we hope to supplement our Raiffeisen banking system, with a chain of Haas societies for agriculturists for whom unlimited liability is unsuitable. Such societies might well produce and sell *ghee*, breed cattle, gin cotton, produce selected seed, etc., etc. They would work directly with the provincial co-operative bank. We hope, too, to get a system of Schulze-Delitzsch banks organized; they will help the tailor who wants to buy a dozen sewing machines or so, the man who wants to start a small scale factory for hats or socks, the man who wants to go into trade, all, in fact, who are of the towns, are outside our rural circle, and who want the services of an honest lending agency which will help also to thrift. Beyond these schemes, and when we have taught our people more about banking and have reserves of non-official staff, we hope to see a provincial joint stock bank with country branches, working separately, but in linked co-operation with the co-operative system. We have definite aims and a programme. How long we shall take to carry it out depends very largely upon the progress of the country in other directions. We may claim to have made some progress, but we recognize that a co-operative system is, and must be, a manifestation of general progress in other directions and of the existence of certain qualities of mind and of character amongst the people at large. Those who know the province cannot fail to understand the formidable nature of the task which Government has to face.

Q. 11.—We have 53 co-operative credit societies of weavers, 5 of dyers, 2 of workers in gold and silver, 7 of basket makers, 4 of workers in brass and copper, 2 of potters, 7 of petty traders, and 1 of leather workers. Membership, 1,066; working capital about Rs. 55,000; and reserve funds Rs. 6,000.

Co-operative societies.

These societies were, for the most part, organized by the Director of Industries and the Registrar of Co-operative Societies. In every case the members have secured some benefit; but circumstances beyond our control have been against the weavers. Some of the weavers have been dishonest; some have, on the other hand, gone to Bombay and worked in the mills and have sent remittances towards their debt accounts by postal order. The dyers have put up a good fight and have struggled to pay. Given a profitable market, we could do much for the weavers and dyers. The Director of Industries has helped much by negotiating supplies of raw material at reasonable prices.

Q. 21.—We shall continue to do all we can to organize and finance co-operative credit societies of weavers, dyers, etc., but we cannot afford to take any greater risks than the ordinary commercial banker takes. Personally, I hold that the development of the town co-operative store offers one path to future industrial development. There ought to be a great future for stores in India. The dividend to custom and the contribution to education, combined with a policy of centralised expansion under a wholesale, fit members to understand and support a progressive policy. The thrift developed by the dividend provides capital; then co-operation proceeds beyond distribution and finds itself in possession of funds not wanted for distributive business. Next, co-operative effort is carried back to the previous stage of production. I may instance the corn mills owned by groups of British stores. The British wholesales control industrial production on the largest of scales. When I was last in England (1911) they produced goods annually to the value of about £8,000,000 or more.

The store movement in industry is, however, limited in its scope, and, generally speaking, it extends only to the production and distribution of goods for local consumption, e.g., the manufacture of wine by the Unione Co-operative of Milan. Surely, in India, there is room for the manufacture of hats, boots, buttons, etc., and the organization of much local industry under a system of co-operative organization? Raw materials will be wanted, and the law of supply and demand should operate to develop both agriculture and industry. But, of course, the store movement does not arrive at production at once; it gets there *via* distribution and thrift and education in common sense business. What stands in the way? The absence of any desire on the part of the educated classes (who alone can take the lead) to initiate a store movement. Again, Government will have to teach, persuade, organize, and supervise. Have Government at present staff for all this work? They have not.

Land policy.

Q. 41.—In my opinion the tenancy laws of the province hamper to a very dangerous extent the development of the co-operative movement. In Germany, and in other countries which (like this province) are countries of small holdings, legislation has steadily progressed towards and has reached ownership. In Germany cultivating owners occupy more than 90 per cent of the cultivated area; in France they occupy about 60 per cent. Belgium is, it is true, a land of tenancy; but elsewhere (e.g., Roumania in 1864) the movement is towards a peasant proprietary. In the creation of a peasant proprietary military considerations play an important part; but it cannot be contradicted that in every country of small holdings co-operation is the corner-stone of the development of agriculture. In our province we have the small holdings without the peasant proprietary, and though I would not go so far as to grant proprietary rights all at once, I do not see how we are to solve the various banking and credit problems before us unless we confer, by legislation, upon all classes of tenants the unrestricted right of transfer in favour of the primary society. Unless this be done, we cannot tackle the all-important question of existing indebtedness, and until that question is tackled nothing approaching the full benefits of the co-operative system can be gained by the province. I speak of the Central Provinces only; in Berar the position is different, and there we can proceed and are proceeding to tackle existing indebtedness. The point is that, on the security of transferable rights in land money can be advanced for long terms; on the other hand, on mere personal security, even though backed by unlimited liability, advances for long terms cannot be made without risks which no banker can accept. Further, on the security of land mortgage bonds can be issued; and a mortgage bond converts a lock-up into a form of security which is fluid. But for the insecurity of tenure (from the lender's point of view) existing in respect of Central Provinces tenants, we should not have been forced to invest more than Rs. 10 lakhs outside the province, and even to lend money to other provinces which we cannot use (with safety) ourselves. A co-operative society is not a land-grabbing usurer, and the tenancy laws should foster and not hinder the growth of the co-operative movement. The Committee on Co-operation considered this particular question "outside the scope of their enquiry." True, it bristles with difficulties of an administrative nature. But co-operation and insecurity of land tenure (once a man owes money to the *malgusar*) combined with restrictions on, or prohibitions of, the pledge of real security to the lender, do not go together. If the co-operative movement is to succeed, then the laws of the land must be favourable to it. The industrial progress of this province will follow in the wake of the development of agriculture; the development of agriculture depends upon the co-operative movement; the co-operative movement depends upon sound finance; and sound co-operative finance on broad and fully effective lines there cannot be till the tenancy law is altered.

Oral Evidence, 21st December 1917.

President.—Q. You say in answer to one of the questions that the effects of the War have been bad for the co-operative societies of small producers. Have you satisfactorily eliminated the possibility of the War being a mere coincidence and the fact that the causes at work probably date much further back?—*A.* They date much further back. I have already referred to the matter in one of my annual reports. But for the War we could have struggled on. We could have struggled on in an unsatisfactory way; but the War was the culminating factor in a succession of adverse influences.

Q. My impression gathered in other provinces is that the co-operative system has not extended to agriculture fully and successfully and I should like to know whether that is a fair impression to gather?—*A.* I think it is. But the co-operative movement is comparatively new in India, and co-operation in agriculture is a difficult matter depending for its success on many things such as the state of general education, good roads, railway facilities, etc., etc. Agricultural societies for supply and production appeared in Europe in 1860; but they did not appear in England till as late as 1900.

Q. Eliminating the conditions due to the War could you tell us what are the causes of the difficulty of applying co-operation to the cottage industries?—*A.* The real difficulty is one which is felt all over the world. Wherever there is a small society of producers (selling as individuals) there is great difficulty in securing a sufficient margin of profit on sales. On the other hand, in the case of a society of workers which sells as a body there is to be had a market for the goods in bulk. The society of small producers fails to compete against the modern factory. The society of workers is, as it were, itself a co-operative factory and it does not appear on the scene until modern industry has appeared, *i. e.*, in countries in which industry is highly organized. In the society of small producers each member sells to his particular middleman; and the influences of the factory are neither emulated nor challenged, the result being that the factory wins.

Q. The question then narrows into one of market. Do you mean to say that results would not be satisfactory unless there is co-operative selling?—*A.* I think the question is one of market. Given the market, co-operative sale would be most valuable. Such sale requires very expert organization.

Q. Would sales agencies facilitate the matter in any way?—*A.* I think they would if the sales agencies could be helped by Government. If we can protect cottage industries to the extent of producing and selling at a price which will yield a satisfactory margin of profit then there is scope for co-operative organisation. Otherwise not.

Q. Have you seen the sales agency at Cawnpore?—*A.* No.

Q. Have you formed any opinion as to how sales agencies should be formed and maintained?—*A.* I have not been able to find a good opening for the formation of any such agencies in this province, and so I have not worked out details.

Q. Would it not be well if some officer visited the sales agency at Cawnpore?—*A.* I have sent men to travel with the products of the co-operative societies; but the difficulty is to find purchasers. People who bought home spins now prefer the cheaper factory-made article with its brighter colours and smarter appearance.

Q. Do you think that bad tastes are setting in?—*A.* I cannot say that; but purchasers prefer the cheaper mill-made article, though it does not wear so long.

Q. Now the number of weavers amounts to a very small fraction of the population and one wants to know whether they will have to be left to themselves or whether there is any real hope of saving them?—*A.* I think it is impossible for co-operative banks, pure and simple, to save them. The problem is one for the State. As a banker I cannot use the money of private depositors in financing industrial societies which cannot sell their products to advantage. If Government steps in with a subsidy or a guarantee and does not mind whether it gains or loses, then co-operative banks and societies can help.

Q. Do you think that there is any real hope of saving them from the technical side which will react financially?—*A.* They might be saved, perhaps, if they were organised by experts from the bottom to the top into cottage factories and if they could be grouped together and if their methods and their products could be improved.

Q. Do you mean to say that even from the technical point of view the case is not very hopeful?—*A.* I do not consider it is hopeful.

Q. You say that you are making attempts to save them by introducing improved methods in the hand loom?—*A.* We are doing our best. One great difficulty concerns money. We have no Government money, and the matter rests largely in the hands of the non-official directors of the central banks. These directors have had experience of the industrial societies and they now refuse to finance them.

Q. Can you say definitely whether, if the hand loom weavers were helped by experts from home with a view to improve their methods, and a good system of co-operative finance were provided, and the market conditions were improved, there is a balance of judgment in favour of the policy now being adopted apparently tentatively by the Government? What is your opinion?—*A.* From a strictly banking standpoint I should not recommend Government to attempt the task of financing cottage industries on a strictly co-operative basis.

Q. You think it is a hopeless task?—*A.* I think the attempt is doomed to ultimate financial failure, for it cannot be placed on a sound business footing, nor yet on a sound co-operative footing.

Mr. A Chatterton.—Q. Don't you think that in all our attempts to help the weaver by the introduction of improved appliances we have lacked the necessary amount of experience and we want to make further experiments?—*A.* I have not the necessary expert knowledge to answer that question; but I think that all experiments ought to be made with State money.

Q. Do you think it is worth while to incur the expenditure?—*A.* As an administrator I should say 'yes', but as a business man 'no'.

Q. Do you think the attempt is necessarily doomed to failure?—*A.* I think that has been the experience in Germany and all over the world. The co-operative society of small producers is no good.

President.—Q. It seems evident that the work now being done by Government is half-hearted and is limited to the employment of a casual expert now and then. The practice of one province is not followed in another. There is such a great variety of methods from province to province. What I want to know is whether if one tackled the problem in right earnest there is any hope of saving the people?—*A.* If you can turn them into so many societies of workers, which are a distinct thing, then I say definitely that though it will be a long and hard task there is some hope. If you are going to turn the weavers or other cottage artisans into co-operative societies of small producers then there is no hope. I would not attempt a society of small producers at all. There are groups of weavers in some of the towns who live separately in so many different hamlets.

Q. Are they units big enough for your purpose?—*A.* Certainly.

Q. Do you think that is the only really hopeful line along which work could be done?—*A.* Yes.

Dr. E. Hopkinson.—Q. By village factories do you mean that the looms are collected in one building?—*A.* Not necessarily. The weavers live in certain specified weavers' quarters and their houses are next door to each other. It would be for industrial experts to say whether it is possible to leave the looms in their houses or whether they would have to work in a small factory under supervision. The village weaver in the rural tracts makes and sells his coarse cloth. He does not compete with the mills. He sells in the local bazar which is probably a few miles off from his home. In his case it is largely a question of the family carrying on the trade from one generation to another, and selling to generations of other families. There is, as it were, a good will attached to the family business.

President.—Q. Will that last long?—*A.* I think it will last for a long time. It will last until communications become very much better than at present.

Mr. A Chatterton.—Q. Is not the survival of these weavers due to the fact that they do not use the yarn which the mills use?—*A.* I do not think so. I think it is simply due to the fact that they are in a water-tight compartment at present.

Mr. C. E. Low.—Q. Is it not the case that in the Central Provinces the weavers have an additional handicap in that the demand for their goods is reduced to a minimum at certain periods of the year and that makes it difficult to finance on a basis which would carry them through?—*A.* That is exactly the case.

Q. Is not the question of a free market also an essential difference between the agricultural societies and the societies of weavers?—*A.* That is the essential difference.

Q. Are not the bulk of the weavers in the Central Provinces scattered?—*A.* I should say that the weaving population is scattered with the exception of centres such as Burhanpur, Jubbulpore, Nagpur, and Raipur. If you go into any one village you will find comparatively few weavers. We actually went into the question and we found that there were only 12 villages in a whole district where you could get ten weavers to register as a co-operative society.

Q. Do you think that the scattered workers offer a greater prospect of success than the concentrated groups of finer workers?—*A.* I do not think so. It would be a very difficult problem to deal with scattered workers.

Q. Turning to other cases are there any successful societies of basket makers and others who have a freer market for goods?—*A.* We have two successful societies of basket

makers and in each case they have left their trade and bought musical instruments with which they manage to earn more.

Q. They are able to buy these instruments by loan from the central banks and they repay?—*A.* And very quickly too.

Q. Do you think that what is wanted is a free market?—*A.* Yes.

Q. What about the potters? You have two societies?—*A.* I think they are going on all right.

Q. That also narrows down into a question of free market?—*A.* It is all a question of free market as far as I, as a co-operative organizer and banker, am concerned. When we have a free market there is no difficulty which we find insuperable.

Q. Supposing greater technical efficiency were secured by improving the methods of the weavers by the help of experts, do you think then that the weavers would be able to compete with the mill-made articles?—*A.* I do not know. I cannot venture to prophesy. But I should anticipate that the mills could undersell the cottage weavers for long periods together.

Q. Have you considered the question of developing the mochis?—*A.* We have been into that question. They are developing on lines of their own and they scarcely need such help as we are, at present, in a position to give.

Q. The difficulty is apparently in regard to finance. At present they have to borrow at high rates of interest. Do you think that a good banking system would help these people?—*A.* The town co-operative bank will help certainly, if each borrower can bring two good sureties.

Q. Has the work of these town banks or urban societies been confined to trade or have they assisted industries?—*A.* I should say that they have definitely assisted industries.

Q. Are there any societies of that type successfully working in the province, a bank helping small trades and industries?—*A.* We have had no time to turn our attention to that side of co-operative enterprise.

Q. Do you think that banks like the Schulze-Delitzsch banks would help?—*A.* I think they would be successful. They are rather difficult to organise, but when organised they will, I believe, be successful.

Q. Do you think a bank of that type would help these mochis?—*A.* Yes.

Q. In connection with the question of finding money to finance industries strictly speaking, as opposed to commercial loans, the system of bonds to finance mortgages on lands in Berar looks as if it might, if developed, assist in the financing of an industrial bank. Could you give us a short account of how this system works?—*A.* First of all, the individual member of a society in Berar, as you know, has absolutely transferable rights in his land. We make sure that he is in a position to grant a first mortgage, and then he mortgages his land to the society with power to remortgage to the central bank. If an individual member defaults his society deals with him. If the society defaults the central bank may pursue the society and may enforce the unlimited liability of any one or more, or, indeed, of all the members, by sale of land or other property. Then the central bank remortgages to the provincial bank, which is the bank of issue for the bonds. A mortgage bond is redeemable at six months' notice on either side. Bonds of Rs. 100 each are issued and sold to the public and they carry 6 per cent interest. We can get deposit money at 5 per cent., and can therefore afford to lock up this 5 per cent. money in a 5 or 4½ per cent. first class and easily realizable security, because on the mortgage business we have a definite two per cent. margin of annual profit. In this way we provide immediate cover against possible notice by holders for the redemption of their bonds. From annual payments a sinking fund is formed for redemption of bonds on maturity, and as this accumulates it liberates the initial covering investment made for each series of bonds.

Q. The amount of money held up is very large?—*A.* It would be but for the conversion of the lock-up by the bonds. I have a waiting list of private persons who will buy bonds to the extent of Rs. 2 lakhs.

Q. You have been working at this scheme for the last three years?—*A.* Yes. I think that if you want money for industries there is every prospect of your being able to float mortgage bonds provided that the margin of security is big enough and the bank of issue possesses public confidence.

Q. Supposing an industry started and received a certain amount of money from an industrial bank, then do you think that in turn the industrial bank could float mortgage bonds on the security of that industry?—*A.* I think so, if the bank carried enough weight with the public.

• *Q.* Supposing the industry itself provided half its capital, the remaining half might be floated in the form of mortgage bonds?—*A.* I think that could be done; and that is exactly where a bank like the provincial bank could help as a bank of issue.

Q. Is it not the case that you have obtained very large sums for the co-operative societies without any Government guarantee?—*A.* It is the case. We have no Government guarantee at all.

Q. You had no Government guarantee for your provincial bank although in a much wealthier adjoining province it was considered necessary?—*A.* That is so.

Q. What do you consider the attractiveness of co-operative deposits due to?—*A.* First of all, there is the substantial rate of interest. We can pay rates as high as 7 per cent. for five years. Then the directors of our central banks are the leading men of the localities they work in, and they carry the confidence of the local public. They are men who have done an enormous amount of unpaid work. Then we have the Government audit, and the Registrar's supervision. Some Deputy Commissioners also take an interest in co-operative work. There is undoubtedly an idea abroad that Government, even though it has not given any guarantee, is deeply interested in the welfare of the co-operative movement. These facts induce a feeling of security.

Q. There are two points of view. People may think that if anything goes wrong Government will pay, and, on the other hand, there may be the belief that Government will not allow things to go wrong because the Government organisation is efficient. Which is the one that weighs more?—*A.* I cannot say. Personally I should say that the idea of the majority is that Government will not let things go wrong. I have heard many people say that Government could not afford to incur the odium of letting things go wrong.

Q. Let us take an instance. You have been Registrar for some time and people have come to have confidence in your powers of management. Supposing another Registrar came, do you think that he would get deposits so readily as you can?—*A.* That is an extremely difficult question to answer in public.

President.—Q. You are willing to say that the personal element is a great factor?—*A.* I think it has great weight. Mr. Low understands the position. I can scarcely describe it. We have the backing of the Allahabad Bank although we owe no money to that bank; and all our doings are closely watched not only by that bank but by our depositors as well as our shareholders.

Q. That means to say that by the selection of the proper officer people have come to place confidence in the banks?—*A.* They have been told there is no Government guarantee. Our connection with the Allahabad Bank is now of old standing. It began in 1907 when I obtained the support of the late Mr. Deans for our first central bank. We obtained a cash credit of Rs. 5,000 and we got it increased, in time, to Rs. 15,000; and as confidence increased we got more. When I raised the question of floating the provincial bank, I had already had experience of the Allahabad Bank and I went to the directors with credentials. I met the Board and discussed the whole scheme with them. Later on, I persuaded the directors to depute Mr. Renwick for three months to tour with me and investigate our Central Provinces system.

Mr. C. E. Low.—Q. Whatever the investing public may think much must depend on Government action? Investors are attracted by the efficiency which they think is ensured by the Government control?—*A.* I think so. Among our biggest depositors are the directors of the central banks themselves. We publish quarterly statements, showing our financial position, in the Central Provinces Government Gazette. That is done under the orders of the Government of India. I think it serves to strengthen the idea that Government does accept responsibility, implied if not express, for the control of co-operative banks.

Q. Among your directors are some of the biggest men in the province?—*A.* There are.

Q. You speak of the Raiffeisen and the Schulze-Delitzsch banks. Would you distinguish between them briefly for the benefit of the members of the Commission?—*A.* In the Schulze-Delitzsch organization, as it now exists, limited liability is becoming more and more the general rule with share capital and two sureties for every loan; in the Raiffeisen system the whole basis of credit rests ultimately on unlimited liability and therefore, the primary society is confined to neighbours who know each other. In the Schulze-Delitzsch society neighbourhood is not so essential as in the Raiffeisen society.

Q. The difference then is that in the Raiffeisen system each man knows every other man and pledges his unlimited liability for him, and in the Schulze-Delitzsch the liability of each member is limited and any one may stand security for any of the members as against the society?—*A.* Yes, that is one of the main differences. The Schulze-Delitzsch organization is for short term industrial (middle class producer business), the Raiffeisen system for agricultural (long-term) credit.

Q. You have a general knowledge of co-operation in India. Do you think that there are any societies of the Schulze-Delitzsch type working anywhere in India?—*A.* I should say some of the Bombay societies are very close to the Schulze-Delitzsch type. There is this difference, that the societies in Bombay which I have in mind are mostly caste societies, and there is caste behind the co-operation.

Q. Then about the cottage industries, you are not very sanguine about helping the weavers by co-operative agencies?—*A.* From the purely administrative point of view I am in favour of all efforts calculated to temper the wind to the weavers in their misfortunes. I do not look upon the matter as a business proposition, but as a problem which Government ought to tackle. I am in favour of using public money for the purpose of helping cottage industries, because I think such a policy will help the development of the country; but as a banker I cannot use depositors' money except in banking business; and the support of decaying cottage industries is not, I need scarcely say, banking business at all.

President.—Q. I should like to know your judgment on a special case of co-operation which we have had before us. It has been cited as an instance of successful co-operation in connection with carpentry. The society consists of 53 members and the shares are Rs. 50 each and the capital is Rs. 2,650. They have overdrawn their account from the district bank by Rs. 28,000 against which they have buildings and plant. I do not know what these are worth. The stock amounts to 12 months' working of the society and it has apparently not been saleable. This has been quoted as a successful instance of "co-operation among carpenters". What would be your judgment?—*A.* I should say that the society is, most probably, fast drifting towards a position in which it will be unable to get any more credit.

Q. You don't think it is a fair instance of "successful co-operation"?—*A.* It is very difficult to say unless you can see for yourself on the spot. A society may look bad on paper but on actual inspection its position may be found to be satisfactory.

Q. But what about the stock on hand?—*A.* It certainly looks as though the members are not able to sell it. I do not know what sort of stock it is.

Q. It is mainly furniture?—*A.* It certainly appears to be very unsatisfactory that they have been unable to sell their stock and that they have accumulated so much.

Mr. A. Chatterton.—Q. With reference to the term "a free market," what do you exactly mean by it?—*A.* I mean a market in which goods can be sold easily and speedily and at a satisfactory profit. I am not referring to such things as tariffs and protection.

Q. With reference to industrial co-operation, is not the difficulty due to the fact that co-operation cannot supply what is needed, namely, technical improvement in the methods of working and managing the industry and so on?—*A.* I do not think that is the only difficulty. I may instance the case of a society of bell metal workers. These people had most detailed attention from the Industries Department when Mr. Low was Director of Industries. He paid that society more than one visit. Mr. Cove who is an expert paid much attention to the society, and he made various suggestions for improving methods; but the members would not listen. Narrowness of outlook and want of education, and an attitude of stupid suspicion are very real difficulties; and even if these were abolished, economies in production are of no avail unless products can be sold at a reasonable profit.

Q. Our problem is to find out means for getting these workers a decent livelihood. The mere association of workers in co-operative societies has proved ineffective. The other alternative is the creation of small hand factories. Should we proceed to train a certain number of the more intelligent workmen or bring in the educated classes and train them up so as to make them master mechanics and master weavers and so on to supervise and generally to direct the operations of small groups of workmen?—*A.* What you really want is a man in charge who understands the particular trade, an expert who could be put in charge and who would be "father and mother" to that trade, with the assistance of the State and of State funds. I should not import outsiders into the trade. The men in the trade are the men you want to raise and train.

Q. You allude to the creation of a class of master craftsmen who will become managers and owners of small factories or associated groups of artisans?—*A.* I do not think that co-operation alone will produce such a class. If co-operation is the only possible remedy, then I think that the cottage industries will disappear. If the persons now engaged in cottage industries are to be numbered—they or their descendants—amongst the industrial classes of the future, then I consider that the State must take action either in conjunction with or independently of the co-operative banks. Too much is being expected from the co-operative banks alone, and also, I venture to say, from the insufficient staff of experts employed by Government and from the ignorant class of people from whom the members of co-operative societies are recruited. It is futile to pitchfork a man into co-operative work and at once parade him as an expert. It is almost as unreasonable as it would be

Mr. G. Evans.

to appoint a Deputy Commissioner to be public analyst. Government cannot understand that the business of co-operation is a constantly progressive and highly scientific business demanding detailed knowledge both of men and of things, and endless study. Until that is understood the economic wants of this agricultural country will never be provided for, and the development of industries will not follow, as it should, fast on the heels of the improvement of agriculture.

President.—Q. You have seen a reference to the fact that certain witnesses have proposed to us the formation of an industrial bank assisted or guaranteed by Government. We have also had other proposals put before us which are rather difficult to carry out. Could you (as an expert financier) help us with your ideas about an industrial bank?—*A.* I have not yet had occasion to face the problem of an industrial bank, pure and simple.

Q. Have you any idea as to how such banks in Japan are financed by Government?—*A.* They are financed largely by money from the Post Office Savings Banks at a small rate of interest. I think it is at present three per cent.

Q. Could you give us any correct idea as to whether such a system is feasible and also how it is done in other countries such as Japan. We have had many statements from several witnesses but they cannot be called accurate?—*A.* I will send Mr. Low a copy of my new book, and there you will find a chapter on Japanese methods.

Q. Have you got any supplementary remarks?—*A.* No.

WITNESS NO. 157.

*Mr. G. Evans, B.A., Deputy Director of Agriculture, Northern Circle,
Jubbulpore, Central Provinces.*

Written Evidence.

General.

Owing to the short notice given and to pressure of work I regret that I have been unable to devote as much time as I should have liked to a consideration of the problems involved.

Briefly, however, I am of opinion that in these provinces the industry of paramount importance is that of agriculture. It would probably be best to concentrate on improving agriculture and its subsidiary industries. The superior grades of the Agricultural Department will have to be greatly strengthened, if appreciable progress is to be effected within reasonable time.

Co-operative
societies.

*Q. 11.—*Agriculture is in a very backward state throughout these provinces, and this may be put down broadly to two causes, *viz.*—

- (1) lack of knowledge,
- (2) lack of capital.

Better methods are being worked out and demonstrated by the Agricultural Department, but progress in many directions is checked by the lack of capital. Money is advanced at reasonable rates of interest to agriculturists by co-operative banks through their credit societies, and as a result the tenant can now, to a certain extent, purchase better bullocks, implements, seed, etc. The Agricultural Department in my circle has always worked in close connection with the Co-operative Department, and demonstration work is primarily conducted in those parts in which the co-operative movement has made most headway.

Great progress has been made in the improvement of the seed supply by this means in the Sehora tahsil and the Betul district, both tracts where the co-operative movement is firmly established. There are several thousand acres of selected wheat now sown by members of co-operative societies in Sehora. In Betul during the last few months 1,300 maunds of selected wheat seed have been supplied by the Agricultural Department through the Betul central bank to co-operative societies. The difficulty in this connection is in the production of sufficient seed, for which the demand far exceeds the supply. More Government seed farms are urgently required.

The question of the supply of improved machines and implements has also received attention. Certain types of cheap ploughs are stocked at selected central banks, and these depôts have sold 1,325 implements valued at Rs. 7,940 in the last two years. This is quite apart from the implements sold from the farm depôts.

A member of a society who wants a machine applies for a loan through his society from the central bank and can obtain it at once. He can also get spare parts to replace breakages, as these are also stocked at the central banks. The question of the purchase of more expensive machines, such as winnowers, by a society for the joint use of the members is being urged and offers a promising field for progress.

A credit bank cannot expect to do more than the above, and it is indeed a moot point whether the agency for the sale of implements, etc., is not outside its legitimate functions. In order to introduce better methods of cultivation, demonstration in the field will be necessary, and it seems to me that an agricultural co-operative organisation working in close connection with, and supplementary to, the agricultural department will be necessary. Such an organisation must have funds and staff of its own, and might work on separate but parallel lines to the credit banks. The District Agricultural Association made attempts in this direction, but are stagnating as they have no funds or staff and the members have no pecuniary responsibilities.

Q. 19.—Great difficulty is experienced in obtaining reliable supplies of certain machines. Special types of implements and machines have had to be designed to suit local conditions. Ploughs of the right design are now made for us by firms abroad, but other machines, such as winnowers, iron gur pans, iron mottes, etc., etc., have to be made locally, and this presents great difficulty. There is a good opening for a company which will turn out *reliable* machines of this sort. Demonstration factories.

At present, however, they are made by several small private firms, and the greatest difficulty is experienced in obtaining a regular supply of machines up to sample. My own opinion is that such a workshop will have to be started in the first place by Government or with the help of a Government guarantee, and under the supervision of an agricultural engineer. In a few years' time it should be possible to hand it over as a going concern to a company. Speaking for my own circle, which is purely agricultural, there appears to be no agency available to start a workshop of this kind except Government.

Q. 31.—Agricultural shows are held annually—

- (1) at the divisional experimental farms at Jubbulpore and Hoshangabad ;
- (2) in each district.

Exhibitions.

These shows, as a rule, create much interest and, in my opinion, help on our work a great deal. The Agricultural and Co-operative Departments hold meetings at the same time, and in one or two of the more advanced districts prizes are also given to encourage any local industries that may exist.

Q. 63.—An agricultural engineer is badly needed for these provinces. He should be in supervising or advisory charge of any workshops that turn out agricultural implements and machines, and should also have a staff of trained mistries whose services should be available for repairing machines in the villages. The agricultural engineer would also advise as to the establishment of pumping plants for irrigation from wells, rivers, etc. Organisation of technical and scientific departments.

There is a large amount of experimental work to be done in designing or adapting agricultural machinery and implements to suit local conditions. This branch of work should also be placed in charge of the agricultural engineer.

Q. 89.—A system of Government certificates of quality should be established for cotton and sann hemp in particular. Certificates of quality.

In the case of cotton, the Harda market formerly held some reputation as producing cotton of superior quality. Rough short staple cotton was raised by enterprising dealers to Harda on purpose to obtain the Harda mark and so get the better price. As a result Harda cotton no longer has a good name.

As a consequence of all this, it is impossible to introduce a better staple cotton as we have found that quality as a general rule is accompanied by a slightly lower yield. Unless the cultivator can get a premium on his better staple, therefore, it pays him better to grow the bigger yielding rough varieties.

Sann hemp is an important product in the Satpuras and, as it is not particular as to its requirements and will grow on poor soils and is a good rotation crop, from an agricultural point of view, it is a crop to be encouraged. Jubbulpore sann, however, is not in such good repute as it used to be, and many complaints have been made from both the Calcutta and London dealers of the amount of dirt present and also of the uneven fibre due to carelessness in retting. In the small local markets which I have visited it was noticeable that there was very little higher premium paid to the grower for bright clean sann. The local dealer, when making up his bales for Calcutta, puts a little clean fibre on the outside and inferior stuff in the middle and gets the price of good fibre for the whole.

The cultivator is not therefore encouraged by a good premium to produce cleaner fibre. The question of the mud percentage in sann hemp certainly requires attention.

Q. 110.—For the development of the agricultural industry in the Central Provinces it will be necessary to immediately strengthen the staff of the Agricultural Department. The demand for assistance from the public is now very great indeed, and it is already practically impossible for the present meagre staff to extend operations. We have no reserve staff whatever to fall back on in case of casualties. General.

Oral Evidence, 21st December 1916.

President.—Q. In answer to question 19, you told us that ploughs and other agricultural implements are being made by several small private firms, and that they cannot meet the demand for uniform quality. You think that Government ought to start a workshop, or that a workshop ought to be started with Government guarantee, if necessary. What about the old question of cutting into private enterprise here. Are we going to be met with that?—*A.* I am rather in favour of such an industry being started with a Government guarantee. You would have to have something of that sort before you could start it.

Q. Even if Government guaranteed, it would be to particular firms, and the little ones would be cut out?—*A.* There are very few little firms making them. We are getting most of our material from abroad. We have had to design all our ploughs and reapers to suit local conditions. I consider ordinary English ploughs to be absolutely useless in this country, and we cannot get them made up to the required quality in India, or at a suitable price, therefore we handed over the designs to firms in England, and they are making them to our patterns. Now that the import is stopped, we cannot get them.

Q. There are several engineering firms in this country; have none of them been tackled on this point?—*A.* I was thinking more of certain improved implements like winnowing machines which are made largely of wood and sheet iron. It is the freight that raises the prices of bulky machines in the Central Provinces. If such implements are imported the price is almost prohibitive on account of the freight.

Q. In the Central Provinces alone there would be a sufficient market to keep one factory in full operation?—*A.* I can give you figures for my circle, which is a poor one. In the last two years I sold 2,865 machines, etc., valued at Rs. 28,630, and that in spite of the fact that I had great difficulty in getting supplies. Last year for winnowing machines alone, we had orders for several hundreds, but could not supply them.

Q. Twenty-eight thousand would not be much of a turnout for any shop?—*A.* The only advertising medium is the Agricultural Department, which is understaffed.

Q. The facts would not be sufficient to warrant starting a firm?—*A.* They would have to make other implements as well.

Mr. C. E. Low.—Q. You say you had an order for several hundred winnowing machines. Winnowing machines run about Rs. 120 each. If you had a free supply of reapers, how many do you think you would have sold?—*A.* One of the things against a rather intricate machine like a reaper is that you have got to teach people how to use them; and, secondly, you have to supply spare parts. You would have to arrange for depôts at various places.

Q. Assuming that that could be arranged, how many do you think you could sell?—*A.* I think you would sell down in the Hoshangabad Division probably 100 a year.

Q. They were priced at Rs. 250?—*A.* Yes.

President.—Q. After the first year would the sales continue?—*A.* Two years before the war started I obtained a consignment of 20 and exhibited them at the agricultural show and received orders for 32 in one day. That was mostly from the Nerbudda Division and the Native States round about.

Mr. C. E. Low.—Q. The difficulty in the Jubbulpore Division is that so much gram is mixed with wheat; they won't touch gram?—*A.* Yes. Before you get reaping machines you want better cultivation. The fields are so rough and so small in many cases.

President.—Q. You have not made a proposal of this kind to Government?—*A.* I have sent it up demi-officially to the Director, and have mentioned it in my Annual Report.

Q. You have not gone further and indicated the amount of capital that would be required?—*A.* No. I don't feel that I am specially qualified to do so. This branch of work ought to be taken over by an agricultural engineer.

Q. That leads the way to your suggestion that you ought to have an agricultural engineer supplementing your scientific experts at present; and generally you are of opinion that the agricultural staff might be very largely increased?—*A.* Yes, that is so.

Q. In answer to the last question you say, "We have no reserve staff whatever to fall back on in case of casualties." Would this be strengthened by the further appointment of senior officers from Europe, or by a mere increase of subordinate staff?—*A.* Both senior officers and a subordinate staff.

Q. Can you indicate any scale on which you would like to enlarge?—*A.* We want one Deputy Director at least for each division.

Q. Those are also the views of Mr. Clouston?—*A.* Yes, I believe so, the matter has gone up to Government, but has been held up on account of the war.

Q. When it comes to bringing your staff up to something like what you have reasonable hope to expect in India, your agriculturists would completely out-number your scientific experts like the agricultural chemists?—*A.* Yes.

Q. Do you think their work would be of a kind that would justify their being greatly in excess?—*A.* I think so.

Q. In other words, your Agricultural Department will become a department of agriculture with a few scientific experts attached; I mean by that, limited specialists somewhere of the order of 80 per cent. agriculturists and 20 per cent. specialists?—*A.* Yes.

Q. The reason I am asking this is with reference to the discussion that took place in Nagpur, where it was indicated that scientific specialists have the same opportunities of rising to the top posts as agriculturists, but if they were completely out-numbered by agriculturists, and the department took a tone of pure agriculture, I suppose those scientific specialists would feel themselves rather out in the cold?—*A.* I suppose they would. If you take the case of the agricultural chemist, I think you would have to have an Imperial Agricultural Chemist in a much better position than at present. He would be the man in control, and this would be the post to which the provincial chemist might ultimately hope to rise to.

Q. Could you hope that the agricultural chemist would ever be Inspector-General of Agriculture?—*A.* I think it possible.

Q. Won't it be more likely that the head man will be an agriculturist?—*A.* I think it more likely.

Q. If that be so, don't you think it might be just as well to run your Agricultural Department as a body of agriculturalists, borrowing from an appropriate Imperial Department the specialist that you want, for long periods, and even in the provinces borrowing your chemist from the Chemical Department, etc.?—*A.* I think it might work satisfactorily. As a matter of fact the agricultural botanist and the agricultural chemist are more or less specialists in their own lines.

Q. And consequently, he would not ordinarily be appropriately senior agriculturist in India?—*A.* In my position as Deputy Director, what I feel most is that I have several official superiors to help me in my administrative work, but I have absolutely no one to advise me in my technical work, and I feel it a great deal. It is not the case at home where you have a number of experts near by to help you. At present our Agricultural Adviser is not an agriculturist.

Q. You think that there is room to form in India a distinct Agricultural Department composed of what we know to be agriculturists—men capable of knowing enough of the different sciences to apply them to agriculture?—*A.* I think so. There is a department of that type in America.

Q. We are thinking of what might be the ideal in a country that is new and developing. The ideal, however, is not the most practical form. Now we have reached this size of department in India, you think it time to consider a sub-division of experts?—*A.* I think it will be necessary.

Q. You would have a more compact department; men with common ideas, and the senior man, presumably also the most distinguished man, would form your natural guide in policy. This would not necessarily disturb the long periods that a particular agriculturist would devote to provinces?—*A.* No.

Mr. C. E. Low.—*Q.* Have you any experience of cotton markets in your circle, or what was till recently your circle?—*A.* I have had a certain amount of experience in Harda and Khandwa.

Q. Will you describe the system in those cotton markets—how the market is organised and how the cotton is sold?—*A.* I know the Harda and Khandwa market. Carts of kapas are brought direct into the ginning factory, and the manager usually has to buy several hundred carts a day. He has no time to look at the cotton properly. He looks at the outside and briefly handles the kapas and gives the cartmen his money on the spot. He has no time to really study the class of cotton. I have known many cases, especially in Khandwa where the cart loads have frequently been found to contain stones in the middle of the kapas to bring up the weight. The cartmen got their price without detection. That system puts a premium on anything like quality. You cannot get any premium on quality.

Dr. E. Hopkinson.—*Q.* Is the cotton sold to the ginning factory?—*A.* Yes, in those parts the cultivator brings his carts direct to the ginning factory and gets his money on the spot.

Mr. C. E. Low.—*Q.* You know the system in the cotton market in Berar, by which a very large proportion of the cotton sold goes direct to the market before going to the ginning factory. Is there anything like that in Harda?—*A.* In Harda it is however a fact that the cultivators bring their carts direct to the ginning factory.

Q. In the Khandwa market?—*A.* It is the same there.

Q. Do you know enough of the Berar cotton market system as to pass an opinion as to whether what is going on in your circle is the same as that going on in Berar?—*A.* I cannot say.

Q. You consider the present system bad?—*A.* Yes, distinctly bad.

Q. What would you consider the system which you think profitable?—*A.* I should not care to make a statement off hand. Cotton is not an important crop in my circle.

Q. How far is local labour adequate for agricultural purposes?—*A.* It is absolutely inadequate at certain times of the year. For instance, in the wheat tracts for the last two or three years, there have been large losses of wheat because growers have not been able to harvest and winnow their crops before the monsoons. Last year a considerable proportion of the crop in the Jubbulpore district had not been winnowed before the monsoon came. The monsoon was of course rather early last year.

Q. That is a state of affairs which is tending to get very much worse during the time you have been in India?—*A.* Yes. It has been slightly relieved lately since the war started, owing to the curtailment of labour on public works. As soon as the war is over, it will become as acute as ever more particularly in this the case where we are trying to introduce better methods of cultivation which require more labour. Increased labour for instance is required for irrigated land. There are some tracts in the Jubbulpore Division which are now commanded by irrigation, but at present labour is absolutely inadequate. Government will probably have to initiate some system of colonisation for these irrigated areas or we shall never be able to make progress quickly.

Q. Agriculture usually has first claim on a man so far as his own holding is concerned?—*A.* Yes.

Q. And anything that industrial concerns get is what is left over?—*A.* Except just round the big towns like Jubbulpore.

Q. My question arose out of the fact that we were talking to the manager of a cement factory, and he informed us that most of his labour was local, and it appeared to be very largely either cultivators or agricultural labourers. He explained the difficulty he felt in getting labour at this particular season of the year during the harvest?—*A.* They will have that difficulty always. In October and November it is very difficult to get labour, and also in the hot weather at rabi harvest.

Q. What does the agricultural labourer in this district get?—*A.* He is earning between three and four annas per day. It all depends. At harvest time you may have to pay as much Re. 1 per day.

Q. Do you know how much that is in excess of what they got before you came to this division 12 or 14 years ago?—*A.* You used to get them at harvest time for 4 annas.

Q. That included the grain they receive in part payment?—*A.* Yes, if you work it out as cash.

Q. And you allow for what they steal?—*A.* That doesn't allow for what they steal.

Q. You had a difficulty in regard to the making of ploughs by Calcutta engineering firms. Were the difficulties due to bad casting and inefficient tempering?—*A.* Yes.

Q. You can get English-made ploughs tempered on one side?—*A.* We have the Meston plough of which we are selling several hundreds annually, chiefly for rice work. A Calcutta firm started making these ploughs, and we commenced an agency for them on the farms. Ransomes, Sims and Jeffrie also made this plough, which they were able to land at Jubbulpore and sell at 8 annas dearer than the Calcutta firm. I could not sell any of that firm's ploughs, as the cultivators refused to touch them.

Q. In spite of the fact that you tried, as far as possible, to push the sale of Indian-made goods?—*A.* Yes.

Q. They are also unable to make the detailed castings of complicated machines?—*A.* Yes, cogs and things of that sort, or rather they do not make them as I suppose it is not worth their while.

Q. And where they do make them, they require so much finishing off afterwards?—*A.* They don't last. In the English and American-made machines, the cog wheels last for years. We had to get the cog wheels from Cawnpore two years ago, and the cogs wore out in one season. Some of the old machines originally sent from America are still going strong, and have been working for 15 years. The wood-work has been renewed, but the cogs are still serviceable.

President.—Q. Are there any patent rights in connection with these agricultural implements, which would clash with your proposal to have a factory here?—*A.* In the monsoon plough there is one particular part which has given a lot of trouble, and the local mistries are copying that part for their ploughs. It is not, I believe, patented in India. I saw a

case mentioned in the Punjab, in connection with the Rajah reaper. The local mistries there are copying one particular part, and the Government resolution said there was no transgression of patent rights.

Q. Is the Rajah plough a patented plough?—*A.* I don't know whether it is patented in India.

Q. They would take steps to take out a patent if you manufactured these ploughs on a large scale in India?—*A.* There has been no trouble about that up to the present.

Q. A local mistry would not be worth prosecuting, but I meant if you started a factory?—*A.* Burn & Co.'s Meston plough is almost exactly the same as Ransome's M. S. N. plough, both made by different firms.

Mr. C. E. Low.—Q. Will you describe what process you go through when you want a new design like that of the monsoon plough; how do you succeed in getting a design?—*A.* When I took over charge at Hoshangabad I found a large collection of ploughs gathered from all parts of the world by various people in the past, from firms in Canada, America, and England. As used to be the case, India was the dumping ground for agricultural machinery. They were bought very often by rich zamindars, and were all absolutely useless, not being designed to meet local conditions. I had tried all these ploughs in detail, and got in my mind's eye what I wanted, but not being a mechanic, I could not make them myself; so I wrote to Messrs. Ransome, Sims and Jeffries' plough designer, who was then touring the world. He had never been to India, and I asked him to come *via* Bombay. He stayed with me for ten days, and we tried some of the ploughs. He went away with the blue print of this plough in his pocket.

Q. Is that patented?—*A.* I suppose so. It is not made in India.

Q. In a case of this kind, would it be worth considering the possibility of encouraging a firm to set up its works on a Government guarantee?—*A.* I think it certainly would. They would take up agency work as well.

Q. The question of agency interferes with any firm now in India?—*A.* The reason why I suggested a Government workshop is because a lot of advertising is necessary. You have also to employ mistries to go round and repair machines. There are no blacksmiths as a rule and the ordinary ryot has not seen a spanner or any implement of any sort. It is rather an uphill task at present, and it is more or less Government's work to put the business on a sound footing and give it a fair start.

Q. The guarantee is only a guarantee that Government will undertake to purchase themselves, or sell through the Agricultural Department a certain number of ploughs, or certain other implements. Do you think that is practicable?—*A.* I should think that is quite practicable for the whole of the Central Provinces.

Q. That being so, what control would you have over prices which they may dictate?—*A.* I don't think they would be in a position to dictate terms. If prices were too high, the people would not buy the machines.

**Q.* But prices might be too high and yet the people may buy. You are thinking now of prices that are so high that people could not afford to buy them. That does not mean that they would be charging twice as much as they need charge?—*A.* They would have to keep their prices down for the first few years before people would buy.

Q. You, at any rate, know the present prices of these things?—*A.* Since the war started prices have gone up to anything like 50 or 75 per cent. and the demand has gone down a good deal in consequence.

Q. That would be under control by importation, because having established their works with comparatively cheap labour, it is probable they might be in a position to make more profit than they would be justified in making?—*A.* I would let them make what profit they can. It is a new industry, and I don't think there is any need for control to start with.

President.—Q. It is all very fine if a ryot cannot afford to pay Rs. 10, but he can afford to pay Rs. 9, and the article might be sold at Rs. 5; the ryot is still being done by Rs. 4?—*A.* I don't mean a permanent guarantee, but a guarantee to start the show.

Q. No firm has ever made a proposition of that kind to you?—*A.* There has been some talk, not a complete proposal. They suggested putting up the capital, and would do it if they got a guarantee from Government, or perhaps a loan.

Q. The other plan would be less likely to be challenged; the only question is the question of the price as the number of articles made may be very varied.

Mr. C. E. Low.—Q. In view of the shortage of labour you allude to, do you think that there is a big future for agricultural implements. I recognise that there are many operations for which we have no labour-saving appliances. Do you think the future would be a big one?—*A.* I think so, but you want better communications: you cannot get your machines about at present.

Q. Communications are especially bad in the Jubbulpore district?—*A.* Very bad.

Q. You have practically no roads?—*A.* Nor carts.

Q. Your proportion of carts to ploughs is lower here than anywhere else?—*A.* Yes.

Q. How would you work this system of Government certificates of quality for raw textiles, referred to in your answer to question 89?—*A.* I suppose we would have to have Government Inspectors, and big central markets.

Q. You have got to get your markets first?—*A.* That is so; at Khandwa and Harda for instance you would have to have markets.

Q. Generally speaking, do you think the marketing system here is satisfactory for agricultural produce in general?—*A.* Not absolutely satisfactory.

Q. I leave out of consideration the fact that many cultivators have to sell to particular purchasers, owing to the financial relations between them, but apart from that, and where a man is at liberty to sell, you consider he doesn't get the price he should in most cases?—*A.* That is the case in the Jubbulpore Division, almost everywhere. "But in the Hoshangabad district they are very much more advanced in certain products, particularly wheat and oilseeds. The quality is well maintained and they get their price there, as the competition is keen.

Q. Is there a market, in the strict sense of the word?—*A.* There are Government markets as in Berar. A man with a good quality wheat will however usually get a premium on his quality in the Hoshangabad District.

Q. But there is no supervision for the control of those markets by anybody, and no means of detecting and punishing malpractices?—*A.* None at all, simply the check of competition. As regards cotton in Harda, there is an amalgamation of the ginning factories. Last year the Japanese bought the whole crop. They had a private arrangement with the local gins.

Q. Will you describe, for the information of the members of the Commission, the manner in which the ryot sells his crop in the Jubbulpore district?—*A.* The main crop that is sold is wheat, the money-making crop. The cultivator sells to a Lalla who comes round from village to village with hack ponies. He generally exchanges his crop for other articles, such as sugar, spices, cloths. He seldom gives cash. The Lalla sells to other middlemen, and the latter sell to the exporters. The result is there are no carts in the villages and the cultivator does not take his produce into the market and consequently does not get the proper price for his produce.

Q. Do you think the market question of sufficient importance to guarantee its being taken up systematically and an attempt made to introduce a more organised system?—*A.* There has been much talk about improving staple in the Punjab. The only way they introduced American cotton was by holding Government auctions. It will be absolutely impossible for us to improve the staple of cotton until the superior qualities get a better premium, because the coarser qualities always yield better.

Q. Would the existing premium in the market at Bombay be effective for your purpose?—*A.* I don't think it would as the middleman makes the profit.

Q. You mean the greater values are not sufficiently divided between long and short staple cotton?—*A.* Not when it has reached the cultivator. I worked it out on Buri cotton and tried to sell on the basis of my results to the Tapti Mills; they promised me one thing but did not pay the real difference in price to the cultivator who consequently went back to the bigger yielding short staple.

Q. Suppose you get the Bombay price as really effective as in the case of the Empress Mills, would it be enough to pay people to grow the long staple cotton?—*A.* I think we can breed a much better staple than we have at present. We want a proper organisation to make it possible to establish it however. The Buri cotton in the Burhanpur tahsil yields one maund per acre of kapas, less than desi cotton. If we got the Bombay price, it would pay cultivators to grow it.

Q. The baling of sann hemp; was that practised before you came to this circle?—*A.* Yes.

Q. Have you seen the way in which the sann hemp trade has sprung up in any fresh places?—*A.* I know the Chappara market and that at Keolaree.

Q. How is it organised there?—*A.* Growers bring their cartloads of fibre in and receive cash per cart. The middleman manipulates the fibre.

Q. The better the fibre the more it lays itself open to dishonest adulteration; won't they pay a better price?—*A.* The extra weight of the mud makes a lot of difference. I believe the Hemp Dealers' Association in London have had to take action about this. The Board of Trade have insisted on the cleaning of the fibre from the mud. The dust shaken out during the dressing processes rendered the air in the factories detrimental to the health of the operatives.

Q. Are any of the larger and more enlightened firms who deal in sann hemp represented up-country, close to the buying points?—*A.* I think so, and they have their Indian agents.

Q. But are those agents of a type that is sufficiently enlightened to give a price for quality?—*A.* I don't think so. From what I have seen, such agencies want to be put on a better basis. Sann is a very valuable crop.

Q. You think it good but that it requires expanding, and that there are facilities, provided you got price for quality?—*A.* The retting arrangements are absolutely inadequate, but we are trying to work out processes of retting in vats.

President.—Q. Is sann hemp grown mainly for green manure?—*A.* No, all for fibre. The price of seed is so great, greater than that of wheat, that it is doubtful if it could pay to grow it for green manure.

Hon'ble Sir R. N. Mookerjee.—Q. With reference to your answer to question 63, don't you get small help from the Public Works Department?—*A.* No; they have got so much work of their own that they have no time.

Q. They have got workshops and could do little repairs?—*A.* The repairs required are all out in the villages, such as for oil engines for pumping and things of that sort, and it means that at present you must have men going out to mend these things, into the villages.

Dr. E. Hopkinson.—Q. A great deal of flax is grown in this part of the province?—*A.* As an oil seed.

Q. Has experiment been made in growing for fibre?—*A.* We have carried out a number of experiments. We have been trying to combine the two, and have made a very large series of experiments with both Dutch and Russian seed, but it does not pay. We carried out these experiments in collaboration with the Fibre Expert from Bengal.

Q. And you came definitely to the conclusion that flax could not be grown for fibre purposes?—*A.* Not under our local conditions. It might give a fair crop for one year but is uncertain and you would have to import seed at regular intervals as it deteriorates.

Q. I think the same difficulty has not been met in Bihar or Assam?—*A.* In Bihar they had an expert from Belgium for five years. You have got the planters there who would take the matter up at once if there was money in it. Our climatic conditions here are not suitable for the production of this fibre. The cold weather is very dry, and the hot weather comes very early. We have retted a lot of this Russian fibre and the percentage of tow was very high indeed. The fibre was inclined to be brittle.

Q. Have the results been published?—*A.* Yes, in the Agricultural Reports about five or six years ago.

Q. In reference to the question about long staple cotton, can you say that you have made a specific investigation in the case of cotton of particular quality, where you have taken not the Bombay price but the Liverpool price?—*A.* All these cottons are grown in consultation with the Imperial Cotton Specialist and he has sent several of these samples home to Liverpool. The Liverpool prices are even better than Bombay.

Q. In those cases which you have investigated, taking Liverpool prices and making allowances, is that not a more profitable market?—*A.* If we get the market all right, but the cultivator does not get the extra price at present.

Q. The whole difficulty is a question of marketing?—*A.* If we could get the marketing we might make progress.

Q. Do you not think that Government might give assistance to marketing?—*A.* Yes, I should like to see it.

Q. Assuming that Government can not give assistance, are there not organisations within the Empire which can and will do so?—*A.* The British Cotton Growers' Association has done something.

Q. It exists for that sole purpose?—*A.* It gave us some money to grow cotton and carry out experiments.

Q. There you have an organisation for the sole purpose of increasing the growth of cotton within the Empire?—*A.* However good the prices are in Liverpool, unless the cultivator gets his share he won't grow the better staple cotton.

Q. My point is, have proper steps been taken to ensure the marketing of a better quality of cotton to the best advantage?—*A.* We have had private arrangements with the Empress Mills; they purchased a certain amount of our long staple cotton.

Q. Do the Empress Mills buy at competitive prices?—*A.* No, nothing has come of it.

Q. What have you in view?—*A.* The difficulty is to get a sufficiently large area grown before you can get a fair offer for a new quality of cotton.

President.—Q. Supposing you improve your transport facilities; would not that be a first step?—*A.* No, you want to get a local market organised for purchasing the new variety.

Mr. C. E. Low.—Q. Is not what is wanted this, *viz.*, simultaneously establishing a decent marketing system with punishment for marketing offences; and in the second place, until these improved varieties cover an area which would give a free natural market, get official assistance from the department, or from some trade organisation to purchase at fair prices?—*A.* Yes.

Dr. E. Hopkinson.—Q. I put it another way; are not influences actually at work which tend to prevent cotton grown in India coming into the world's market?—*A.* I cannot say. Another point is that we have not really tackled the question of long staple cotton properly. We have simply been trying outside varieties, American cottons and cottons from Cambodia and Egypt, etc. What we have to do is to breed cotton ourselves in India, under local conditions. Our climate is different from up-country, for instance.

Q. You started by saying that if Liverpool prices could be obtained, the long staple cotton which you can grow would be a better proposition?—*A.* What I meant to say was that if you want to start the thing we have got to get nearer the yield of the local cotton, and not rely too much upon the difference in prices. I don't think we have gone into that matter sufficiently. If we had got a better price for Buri cotton, we might possibly have established it. We want to breed much better yielding cotton than Buri however. Even if we did breed better staple cotton, it would be difficult to establish it on the market. You would probably never get the same yield as for local short staple cottons.

President.—Q. Supposing you can grow the cotton which you prove can be grown on a small scale; supposing that the market facilities were clear, *i. e.*, there was no special difficulty in marketing your long staple cotton; would it pay the ryot then to grow that variety; would you get in a free open market a sufficiently different price to make it worth his while to grow? Is the difference in quality sufficient to warrant it?—*A.* I think it could be done. I don't think we have got the variety yet. We want to do more research work in that line.

Dr. E. Hopkinson.—Q. Are you proposing further research work?—*A.* Yes.

Q. Do you not think it would be better to sell under some better system of marketing?—*A.* That would have to go concurrently. Even if we did get a good variety it would be difficult to establish it.

Q. Leaving aside the world's market altogether, we were told by the highest authority in Cawnpur that they would welcome any amount of cotton with long staple. Are we to deduce from what you say that it is all very well for them to say they would welcome it, but they won't pay a proper price?—*A.* That is one thing, but I think the reason is that although they might have got a fair price for Buri, it has not proved really suitable. In some seasons it will give you a good crop, but taking it season by season, it cannot compare with the local variety in anything like outturn and hardiness; therefore we have not got to the stage when we have a variety that we can recommend in respect to yielding characteristics. We have not got far enough in our research work.

President.—Q. In a case of this kind would it not be feasible for the Government to undertake to buy a new variety, whether cotton or anything else, which would yield more to the ryot under fair conditions? At the recognised market rate *minus* cost of transport?—*A.* I think it would, once you have gone carefully into the matter and threshed it out.

Mr. C. E. Low.—Q. Has that not been done in several other provinces by Government?—*A.* In Madras and Bombay it has been done, and that was the foundation of American cotton in the Chenab Colony.

Dr. E. Hopkinson.—Q. You know that they are actually importing American cotton into the market?—*A.* Yes, they have been importing it for a long time.

Q. You have good hope of putting a stop to that in the course of time?—*A.* We hope to. As a matter of fact, the cultivators are getting such a good profit for any sort of cotton that they don't mind what they grow. That is really at the bottom of the whole thing. If the cultivators really clubbed together, they would get a good price, but as a matter of fact, the price of cotton has been very good for years, and it pays better than other crops.

Q. You mentioned a short time ago that you were in communication with Mr. Leake at Cawnpur. I want to ask how does that communication come about—in the natural course of your duties?—*A.* I know Mr. Leake personally, and have seen his cotton, and not being contented with the local cotton I asked him to send some of his selections down to me for trial.

Q. Have you enquired what is going on in Sind and the Punjab?—*A.* I sent a lot of my own wheats to Sind and the Punjab and I have sent several hundred maunds of selected wheat to Bundelkhand. We are always interchanging views.

Q. Do you find that other agricultural experts are ready to interchange views and get to know what you are doing?—*A.* Yes, they are always corresponding with me.

Q. Do you think the system of inter-communication is now quite satisfactory?—*A.* I think so. I have had no difficulty at all. Much of my correspondence is D. O. I think that has very largely come about by holding the Boards of Agriculture, where we have a chance of meeting each other. I attended the last meeting two years ago. That is one of the main functions of a Board of Agriculture.

Q. I think at the last meeting the first thing that was done was to abolish the Programme Committee?—*A.* I don't think the programmes were of very much use. You cannot criticise without seeing a man's work on the spot.

Q. Is there any means of preventing overlapping?—*A.* That can be done by the Agricultural Adviser.

Q. Have you published anything yourself?—*A.* I have written several articles for the Pusa Journal.

Q. Are those articles subject to any sort of editing?—*A.* The Journal edited by the Agricultural Adviser, the Bulletins and Memoirs are edited by the Committee. My articles have appeared without alteration.

President.—Q. Aren't there many cases of results obtained that you have not worked up to the stage that you considered to be suitable for special purposes, and yet are valuable and suggestive to other workers?—*A.* Yes, there are.

Q. In that case the Imperial Agriculturist should keep the different provinces in touch, because he would not be in a position to write long letters to somebody in Madras or Bombay giving him tips?—*A.* All our work is really published from the different agricultural stations. If the man wanted anything he would write to me direct.

Dr. E. Hopkinson.—Q. I understand that you have definite scientific results which you are prepared to publish, but which you will not publish under present conditions?—*A.* The Central Provinces Department of Agriculture can publish them. We publish our own bulletins, which are circulated all round India.

President.—Q. That is not my point. You reach a stage which gives suggestive results, but are overloaded with other work and cannot follow up these results. You have got a line which ought not to be dropped, and which you intend to take up when you have time. If the Inspector-General were actively in communication with you, he would know of these things, and would get somebody else to take them up.

Dr. E. Hopkinson.—Q. I understand that you have published things in the Central Provinces bulletins, which, in your opinion, would be more suitably published in the Pusa bulletin?—*A.* Not necessarily. I have had no trouble with Pusa about publishing my results. Most of the things I have been working on are of primary importance to the Central Provinces.

Q. And you think that the Central Provinces bulletin get sufficient circulation?—*A.* They go all over India and the Colonies. We send them to all the scientific journals at home.

Q. With regard to the establishment of workshops, I understand from your evidence that agricultural implements which have been bought in large quantities have been bought through the co-operative credit societies?—*A.* Only a certain proportion of them; less than half of them in the last two years; the rest from depôts.

Q. Who runs the depôts?—*A.* The Agricultural Department. They provide the capital. Government gives me a permanent advance to keep a stock.

Q. Do you sell outright, or on the hire purchase system?—*A.* Outright, never otherwise, and we therefore sell to those who can afford to pay up the whole money. If poor people want to purchase, they have got to get a takavi grant or a loan from the co-operative bank.

Q. You sell at a profit?—*A.* We take 5 per cent. profit, our idea being that when we hand this arrangement over to private firms—which we hope to do sometime or other—the prices won't increase very much.

Q. You being comparatively large buyers can buy on more favourable terms; you get tradesmen's terms?—*A.* No, we don't; we cannot buy very large quantities. My permanent advance for Hoshangabad Farm is only Rs. 4,000 for instance.

Q. In the case of the monsoon ploughs, would it not be wise for the Government of India to buy the ploughs and get the tradesmen's discount?—*A.* Yes, it would.

Q. Has the proposal ever been put forward?—*A.* No, it has not.

Q. Do you personally supervise the buying?—*A.* Yes. They are all ordered by me.

Q. Whom do you buy from?—*A.* Different agents in India, sometimes direct from abroad, if there is no agency in India. Certain implements which are now established I have simply handed over to an agency of private firms; for instance, Volkart Bros. have taken over the agency for Nerbudda reapers.

Q. Do you fix the price, or are they allowed to raise the price on the ryots?—*A.* They can do what they like in regard to price.

Q. You suggest that sales might be made by agricultural co-operative societies, or some other organisation?—*A.* That is a point that is under consideration. At present the central banks are appointed as agents, and it is a question whether these banks should act as agents.

Q. You have a different idea independent of credit banks; you say, "it seems to me that an agricultural co-operative organisation working in close connection with and supplementary to the Agricultural Department will be necessary"?—*A.* The point is that at present we are trying to get the credit banks to do all this work, and it is really not their business. You would have to have some sort of separate organisation to deal with this branch of business. That is the general expert opinion.

Q. Such an organisation will require the backing of Government?—*A.* Yes, we will have to raise the capital somehow or other, and get an additional Government loan. Something of that sort will have to be done. The Agricultural Department cannot do business on the large scale that is developing.

Q. Arising out of that you suggest the appointment of an agricultural engineer?—*A.* That is not necessary. We want an agricultural engineer for all sorts of purposes. The workshop for making agricultural implements was quite a separate thing.

Q. The repairing and making of agricultural implements, could that not be done by co-operative organisation with skilled assistance from Government?—*A.* Government would require somebody to supervise. They will have to employ mistries to repair machinery, etc., for the first few years.

Q. It is possible that that could be done by local effort, with the assistance of Government so far as skilled supervision goes, and possibly to some extent as regards capital?—*A.* Yes.

Q. But no continuous financial help?—*A.* No, I don't think so. In time it ought to stand on its own legs.

President.—Q. Do you know the constitution of the Irish Agricultural Societies? Do you know that they do work of this kind?—*A.* Yes, but they are not credit associations.

Dr. E. Hopkinson.—Q. If you studied their constitution do you not think you might get some valuable ideas as to how this scheme might be developed?—*A.* Yes, this idea is Mr. Crosthwaite's. We are working together and we have been trying to run unions, attached to the credit banks but find there is no staff to do it.

Q. You told us that when the sale of certain implements is established you hand it over to an agent. Presumably that is for the purpose of freeing you for what you describe as more important work?—*A.* We have not got the staff who could do it.

Q. Who decides at what point you hand over to an agent?—*A.* I think it was considered by the Board of Agriculture several years ago. The policy of handing sales over to an agent was in order not to interfere with private sales.

Q. Then each province is at liberty to decide for itself as to when that stage is reached?—*A.* Yes.

Q. Are there no variations in judgment as to when that stage is reached?—*A.* There are.

Q. Do not cases arise where a Deputy Commissioner considers the rule inapplicable? What then?—*A.* He goes to the Local Government. The Board of Agriculture only recommends.

Q. Coming back to the question of hemp, if the quality of the hemp could be made more uniform would not the fine quality always command a higher price; in other words, are not the cultivators too apt to adulterate the fine quality and so spoil their chances of gaining the buyer's confidence?—*A.* I don't think so. The presence of a lot of mud is not always intentional. They have got to rett the sann in muddy water, and a lot collects in that way.

Q. If they could be taught to put on the market a cleaner sann hemp, the buyers would respond?—*A.* Yes, I think so.

Mr. Chatterton.—*Q.* You say that "An agricultural engineer is badly needed for these provinces." You have the Director of Industries and Agriculture combined; would you attach the agricultural engineer to the industrial or the agricultural branch?—*A.* I should be inclined to put him in the agricultural branch. I don't think it matters much in this province, because we would be in close touch with him.

Mr. F. Reid.

Q. Is there any scope here for the extension of the use of pumping plants?—*A.* A good deal from rivers. The difficulty is lack of mechanics, and the remoteness of the villages. If a machine goes out of order, we have to get mistries from Bombay at present. I have several pumping plants established which are doing very well. All I do at present is to satisfy myself that there is a sufficient supply of water in the wet place and then refer the matter to one of the firms in Bombay or Calcutta to send an engineer and erect the plant.

Q. That makes it expensive to the ryot?—*A.* Yes, very prohibitive.

Q. You would want more than one agricultural engineer?—*A.* Yes, eventually, but we would be quite content to start with one.

WITNESS NO. 158.

Mr. James Reid, Manager, Perfect Pottery Company, Limited, Jubbulpore.

Written Evidence.

Q. 5.—Different industries and different persons or bodies would need different treatment.* One would like to be supplied with machinery on the hire-purchase system, another a loan at a reasonable rate of interest on the security of his plant and machinery. Government assistance.

Personally I think pushing persons with a knowledge of their trade should be helped by Government.

From my personal knowledge I am aware of a man starting an industry in such a way and within the short period of a couple of years capitalists have come forward, paid the pioneer handsomely, and started the work into a company.

Q. 18.—I am of opinion that any research by a Government expert for a private person should be kept confidential. Technical aid.

Q. 37.—I am of opinion that Government should either call for tenders or forward lists of requirements to factories, leaving factories to take action. Government patronage.

Q. 42.—If the land belongs to Government it should be leased on reasonable terms. If private land, it should be acquired for the starting of an industry on reasonable terms. Land policy.

Q. 43.—Acquisition proceedings should be expedited so as to enable possession being taken as soon as possible instead of allowing proceedings to hang on for years.

Q. 111.—So far as I am aware there are good openings for the starting of pottery works as there appears to be sufficient raw material in abundance, and many of the wares at present imported could easily be manufactured in the country. General.

In conclusion I may be permitted to say that having landed in India about three years ago I have had very little experience of industries in this country. All my experience has been confined to the pottery works of which I have been manager. I cannot, however, refrain from saying that in undertaking an industry, especially like a pottery works, the services of a really competent workman should be secured before commencing operations.

Oral Evidence, 21st December 1916.

President.—*Q.* You have in Jubbulpore a fairly good centre for pottery factory?—*A.* Yes.

Q. And the raw materials are obtained near at hand?—*A.* Yes.

Q. In the matter of transport of pottery do you get any special concession in railway freight?—*A.* In some cases, but not in all. We have a special rate for Bombay, for instance.

Q. For all forms of pottery?—*A.* Yes. Our customers in Baroda can purchase goods at Bombay cheaper than they can purchase direct from us. If we send goods direct, the Bombay-Baroda and Central India Railway for their part of the railway charge three times the price, and to-day a customer was complaining to me about the same, that he was compelled to take goods from our agents at Bombay instead of dealing direct with us. *

Q. And pay the agent's profits also?—*A.* Yes.

Q. What about Calcutta?—*A.* We cannot compete in Calcutta at all.

Q. But the distance from here to Bombay is approximately the same as to Calcutta?—*A.* Yes.

* See note at the end of the oral evidence of this witness.

Q. And still you do not get a favourable rate for Calcutta?—*A.* We have up to Shalimar over the Bengal-Nagpur Railway.

Q. And not over the East India Railway?—*A.* No.

Q. You have tried both of them?—*A.* We have not been doing much business in Calcutta. We cannot compete with Ranigunje factories or with Messrs. Bird and Company.

Q. East Indian Railway has got a fair justification for not offering favourable rates?—*A.* Yes.

Mr. C. E. Low.—*Q.* Where do you get your labour from?—*A.* Most of our labour is from Khols and Chaimars from the Native States.

Q. You house your labour?—*A.* Yes.

Q. Do you get any Kumhars?—*A.* Very few.

Q. Do you employ them in the more skilled portion of the work?—*A.* Yes.

Q. I suppose none of your labourers are literate in vernacular languages?—*A.* The majority of the labouring class are illiterate. They can neither read nor write.

Q. Do you notice any difference between those manual labourers who are literates and those who are not?—*A.* The majority are illiterate. We have 3 or 4 literates.

Q. Do you notice that they are better than the others?—*A.* I think so.

Q. Do you take any apprentices?—*A.* Yes.

Q. From what class?—*A.* Now we have taken on apprentice Babus, and we find that they take a better interest in the work than the labouring class do.

Q. What is the education that they have had?—*A.* Of course, they can read and write vernacular. They do not know English.

Q. On what terms are they coming in?—*A.* They work under a contractor, and are paid according to their work. There are no special terms. We have just begun taking apprentices.

Dr. E. Hopkinson.—*Q.* What kind of pottery do you make?—*A.* We make all kinds of ware.

Q. Is any high class pottery made in India?—*A.* I do not think so. We are commencing to do it. We make enamelled wares. The raw materials are very good for that class of ware.

Q. You have every hope of making it a commercial success?—*A.* Yes.

Q. Where do you get your white clay?—*A.* From home. We require a very small quantity.

Q. I suppose the high ocean and railway freights from home for that kind of ware have given you an advantage as against the British maker?—*A.* I do not think so. The home maker can compete with us in India. The railway freight to the coast kills us.

Q. Where do you expect to send this class of ware?—*A.* Calcutta, Bombay and Delhi. There is a big demand in Delhi.

Q. I suppose that it is the ocean and railway freight up-country which has really induced you to start that class of business?—*A.* Yes. That is so. We ought to be able to make much cheaper in this country where raw material can be had than it is to get it from home.

Q. You say that an industry should not be started without the aid of skilled foremen?—*A.* Yes.

Q. Do you mean that the Government ought to provide such foremen?—*A.* No.

Q. You, at any rate, do not want Government assistance?—*A.* No.

President.—*Q.* Have you been in touch with the results that are being obtained in the Bombay School of Mines in connection with clays in India?—*A.* No.

Q. They are making a large number of experiments on different kinds of clay obtained all over India. You may get into touch with the Superintendent of the School and you may find out whether he can give you any information as to the occurrence of clay that may suit your purpose?—*A.* I have tried a few clays myself.

Q. You do find there is a dearth of information regarding clays in India?—*A.* Yes.

Witness subsequently sent the following note:—The attached list shows the rates of railway freights in force for some of the railway stations in India where the Perfect Pottery Company's goods have been despatched during 1916. It will be seen that in some

cases the Great Indian Peninsula Railway Company has given concession rates for certain stations, *e. g.*, Bombay, but higher rates in proportion for intermediate stations. It will also be apparent that in through booking with the Great Indian Peninsula Railway, the Great Indian Peninsula Railway have granted the reduced rates as far as the lead on their line is concerned, but then the other connecting railways have made their rates exorbitant, thus making it impossible to deliver wares at profitable rates at destination. For example, the freight rates shown in the enclosed list for Bangalore are Re. 0-0-3, Re. 0-7-4 and Re. 0-5-0 or a total of Re. 0-12-7 per maund. The consignments in this instance are loaded at the works siding and booked from Howbagh, Bengal-Nagpur Railway (narrow gauge), to Bangalore *via* Jubbulpore. The distance on the Bengal-Nagpur Railway from works to Jubbulpore railway station is only 4 miles (charges being made on the minimum of 11 miles) and Re. 0-0-3 is charged. At Jubbulpore the transshipment into broad gauge waggons is done by our labour. The broad gauge waggon then goes up to Guntakul, Raichur being a station of the Great Indian Peninsula Railway; 880 miles from Jubbulpore, the freight is charged at Re. 0-7-4 per maund or 10 pie per maund per mile scale. The line from Raichur to Guntakul is broad gauge Madras and Southern Mahratta Railway, from Guntakul to Bangalore metre gauge Madras and Southern Mahratta Railway. The mileage from Raichur to Bangalore being 250 miles the freight charged is 24 pie per maund per mile scale or nearly $2\frac{1}{2}$ times more than the rate of the Great Indian Peninsula Railway. This rate should be the same as on the Great Indian Peninsula Railway, *i. e.*, Re. 0-2-0 per maund. In other words in through booking the consignments with other railways similar rates should be charged on all railways concerned.

If this were the case the freight to Baroda and Ahmedabad would be much lower as far as the Bombay-Baroda and Central India Railway line is concerned, thereby making it unprofitable for the merchants to go to Bombay to get pipes, etc., cheaper there than by purchasing direct from the makers (Perfect Pottery Company).

In the list it will also be seen that the lowest rate for some places only is 10 pie per maund per mile and much higher for other stations such as 40, 24, 33.

Sufficient data not being available, it is impossible to compare ship freights with the railway charges in India.

Subsequent to my examination it has been brought to my notice that the East Indian Railway Company have equalized the rates for Calcutta.

Statement showing the freight rates in force for the undermentioned Railway Stations in India.

Serial No.	Stations goods booked		Rate of railway freight per maund.	Names of railways.	Per maund per mile scale.	REMARKS.
	From	To				
1	2	3	4	5	6	7
1	Howbagh	Surat	Rs. a. p. 0 0 3 0 6 8 0 4 8	B.-N. R. G. I. P. B.-B. & C. I.	Pies. 20 35	Goods can be purchased at cheaper rates from Bombay for this place.
2	Do.	Khirsadoh	0 3 7	B.-N. R.	24	Freight on coal from this place being only Re. 0-1-11 per maund.
3	Madanmahal	Poona	0 7 8	G. I. P.	14	
4	Howbagh	Bangalore City	0 0 3 0 7 4 0 5 0	B.-N. R. G. I. P. M. & S. M.	10 24	Concession rates.
5	Do.	Wari Bunder	0 0 3 0 5 2	B.-N. R. G. I. P.	10	Reduced rates.
6	Do.	Seoni	0 1 7	B.-N. R.	16	
7	Jubbulpore	Benares Cantonment.	0 4 9 0 2 3	E. I. R. B.-N. W. R.	25 35	

Statement showing the freight rates in force for the undermentioned Railway Stations in India—(Contd.)

Serial No.	Stations goods booked		Rate of railway freight per maund.	Names of railways.	Per maund per mile scale.	REMARKS.
	From	To				
1	2	3	4	5	6	
			Rs. a. p.		Pies.	
8	Madanmahal	... Cawnpore	0 6 2	G. I. P.	'14	
9	Howbagh	... Hingoli	0 0 3	B.-N. R.		
			0 6 1	G. I. P.	'16	
			0 7 0	B.-B. & C. I.	'34	
			0 0 3	Terminal.		
10	Do.	... Secundrabad	0 0 3	B.-N. R.		
			0 12 3	G. I. P.	'15	
			0 4 0	N. G. S. R.	'40	
11	Do.	... Petlod	0 0 3	B.-N. R.		
			0 3 3	G. I. P.	'10	Reduced rate.
			0 6 2	B.-B. & C. I.	'33	
			0 0 9	P. C. R.		14 miles from Arand.
12	Do.	... Delhi	0 0 3	B.-N. R.		
			0 7 7	E. I. R.	'14	
13	Do.	... Allahabad	0 0 3	B.-N. R.		
			0 4 0	E. I. R.	'21	
14	Do.	... Baroda	0 3 3	G. I. P.	'10	Goods can be purchased cheaper from Bombay.
			0 6 4	B.-B. & C. I.	'33	
15	Do.	... Ahmedbad	0 0 3	B.-N. R.		
			0 3 3	G. I. P.	'10	
			0 7 7	B.-B. & C. I.	'32	
16	Do.	... Mysore	0 0 3	B.-N. R.		
			0 7 4	G. I. P.	'10	
			0 7 0	M. & S. M.	'33	
17	Do.	... Gwalior	0 0 3	B.-N. R.		
			0 1 2	E. I. R.	'24	
			0 4 6	G. I. P.	'17	
18	Do.	... Balaghat	0 1 7	B.-N. R.	'16	
19	Do.	... Itwari	0 3 4	"	'25	
20	Do.	... Ferozabad	0 0 3	"		
			0 6 5	E. I. R.	'16	
21	Do.	.. Mandla	0 2 0	B.-N. R.	'23	

Statement showing the freight rates in force for the undermentioned Railway Mr. K. K. Bernard.
Stations in India—(Concl'd)

Serial No.	Stations goods booked		Rate of railway freight per maund.	Names of railways.	Per maund per mile scale.	REMARKS.
	From	To				
1	2	3	4	5	6	7
			Rs. a. p.		Pies.	
22	Howbagh	Madras	o o 3	B.-N. R.		
			o 7 4	G. I. P.	'10	
			o 5 o	M. & S.M.	'17	
23	Do.	Akola	o o 11	B.-N. R.		
			o 7 2	G. I. P.	'17	
24	Do.	Hinganghat	o o 11	B.-N. R.		
			o 5 6	G. I. P.	'10	
25	Do.	Kharsia	o 7 10	B.-N. R.	'22	
26	Do.	Amraoti	o o 11	B.-N. R.		
			o 7 11	G. I. P.	'17	
27	Do.	Bhandara	o 2 6	B.-N. R.	'15	
28	Do.	Pulgaon	o 3 4	B.-N. R.	'25	
			o 1 2	G. I. P.	'21	
29	Do.	Burhanpur	o o 3	B.-N. R.		
			o 4 1	G. I. P.	'16	
30	Do.	Amritsar	o o 3	B.-N. R.		
			o 7 7	E. I. R.	'14	
			o 4 7	N. W. R.	'17	
31	Do.	Amballa	o o 11	B.-N. R.		
			o 7 7	E. I. R.	'14	
			o 4 6	N. W. R.	'31	

WITNESS NO. 159.

Mr. K. K. Bernard, M.A., Professor, Robertson College, Jubbulpore.

Written Evidence.

I am interested in inventions. I have already obtained patents on a few and have several others on hand which I purpose to patent when the war is over.

Firstly, I beg to point out the great handicap there is on inventors in India,—the difficulty of getting models of inventions made, and the further difficulty of getting any invented article (unless it be of an extremely simple nature) manufactured in India

on a commercial scale. I may be permitted to say that I invented three things lately—an automatic recording attachment to a billiard cue, a storm-and-punkah-proof attachment to an ordinary lamp chimney, and a novel and interesting naval war-game. I could not get any one of these manufactured in India at a cost at which it could be marketed commercially. I beg to suggest, therefore, that there should be established, in the capital cities like Bombay, Calcutta, etc., properly equipped workshops which would undertake to help inventors in making working models of their inventions; and that the Department of Commerce and Industry should undertake to put inventors in touch with firms and other parties who would be willing to undertake the manufacture of any saleable and useful invention.

In America and elsewhere there are agencies and patent attorneys who act as intermediaries between inventors, on the one hand, and, on the other, capitalists and investors who are looking out for useful and profitable inventions to place on the market, either on a royalty or other basis. Could not something similar, even on a small scale, be undertaken in India also?

Secondly, I beg to point out that India is not included in the list of countries which have joined the "International Convention for the Protection of Industrial Property," in which even such countries as Tunis have joined. This places inventors in India at a great disadvantage, as an inventor in India who has applied for an Indian patent does not get the benefit of the priority of claim in the countries joining the Convention which an inventor in one of those countries would get with regard to the other countries included in the Convention.

I beg to suggest, therefore, that India should also join the International Convention.

Oral Evidence, 21st December 1916.

President.—Q. You are a professor in the Robertson College?—*A.* Yes. I am a professor of English.

Q. How is it that you are interested in mechanical inventions?—*A.* I am an M. A. in physical science. It is by mere chance that I happen to be professor of English.

Q. Then how did you become a professor of English?—*A.* I am a first class graduate in English language and literature of the Madras University.

Q. What is this International Convention for the Protection of industrial Property that you speak of?—*A.* It is a convention of various countries, so that any invention that has been made in one of the countries that have joined this Convention is automatically protected for a period of twelve months in all the other countries.

Q. Do you mean the International Patent Convention?—*A.* Yes. (Witness showed a book referring to the Convention he speaks of.)

Q. Have you seen the text of the Convention?—*A.* No.

Q. But you advocate it to us as something that the Government ought to take up. We should like to know more about it.

Dr. E. Hopkinson.—Q. Why do you say that India should join the International Patent Convention?—*A.* The advantage is that the invention of an inventor who applies for a patent in India will be protected for 12 months in all these other countries. If India does not belong to the Convention, and I apply for a patent to-day in India, to-morrow anybody else may apply in England, and I shall be ousted.

Q. The Convention applies to both sides in that the inventor who applies for protection in England would also get protection in India?—*A.* Yes. India is very much worse off than England. As a matter of fact many inventors do not even care to patent their inventions in India, because India is so backward in the matter of manufacture.

Q. Are there more inventions in England or in India?—*A.* In England.

Q. Is it not then more to the advantage of India that the inventor in England should not get protection in India rather than the small number of inventors in India should get protection in England?—*A.* It handicaps the inventor in India. You will be hit the other way.

President.—Q. If we belonged to the Convention, if you had an invention here, your invention would be protected for twelve months in England, but at the same time there would be 200 inventors in England who would be covered in India, and probably one of these 200 would have anticipated your patent. I do not think you have made out a case for recommending the proposal to the Government.—*A.* I was merely making a suggestion.

WITNESS NO. 160.

*Mr. M. Hill, C.I.E., F.L.S., Chief Conservator of Forests, Central Provinces.**Written Evidence.*

Forest Department.

The produce from Government forests is broadly classified as major forest produce, which includes timber and fuel, and minor forest produce comprising bamboos, grasses, fruits, leaves, fibres, resins, gums, oils, tannins, catechu, honey, wax, minerals, etc. As regards major forest produce, for the valuable timbers, *e. g.*, teak, sal, shisham, etc., the uses of which are well-known, there is generally a ready market and the amount of outturn available under the working plans is usually disposed of at good prices. The work of extraction is now mainly done by purchasers, though Government in past years has frequently led the way in converting and transporting timbers to suitable markets, by departmental agency, *e. g.*, sleepers, timber from the Andamans. Generally speaking, the use and value of the more important species are sufficiently well-known to ensure their utilization.

It is among the species generally considered to be of comparatively little value that there seem to be possibilities of industrial development, *e. g.*, utilization in the form of wood pulp or as sleepers after treatment in match industries, etc. Several investigations have already been made in these directions by experts engaged by Government and by the staff of the Forest Research Institute.

Of major forest produce removed in the form of fuel there is not much to be said; the gradual improvement of communications (roads and railways) makes it possible to work profitably areas where the cost of extraction and transport has previously been prohibitive. But it is, I think, in the utilisation of minor forest products that the greatest possibilities of commercial development exist.

A good deal has been done already in this direction, but there is a great amount of work still to be done, and the prospects are such, I consider, as to justify fully a large staff of experts. A certain amount of pioneering work has been done by Government, *e. g.*, rubber plantations in several provinces, notably the hevea plantations in Burma and the ficus elastica plantation in Assam, which are, I believe, with the possible exception of the Java plantations, the pioneer rubber plantations of the world. The tannin factory at Rangoon was erected to demonstrate the uses of certain barks for the manufacture of tannin extracts, and since the creation of the Forest Research Institute, investigations have been made into a large number of minor forest products, and the results have been published from time to time.

But the existing staff is only sufficient to undertake enquiries into a few of the numerous products available. A glance at works such as Watt's Dictionary of Economic Products and the various forest floras and descriptive lists of species, that are available, will show that there is scarcely a tree or shrub that does not yield something that may prove on expert examination to be of commercial value.

Remarks such as "The inner bark yields a strong fibre", "Fruits and flowers are used medicinally", "Bark yields a gum", "A dye is obtained from capsule", "Seed used as a substitute for coffee, etc. etc.," frequently occur, and many diseases are mentioned for which the medicines obtained are considered to possess curative properties.

What we require is a body of highly trained and practical experts who would make full investigations and experiments into single products or group of products on a sufficiently large scale to demonstrate their commercial value, and where the value of any product is well-known to improve on the wasteful methods of native manufacture. The experts should, I consider, be full-time men, with good pay and prospects and I think their research work might be independent of the Imperial Institute in England, save that this Institute might give aid in placing any particular product on the market.

The experts for forest research might form part of an Imperial scientific and technical department. When the commercial value of any product has been proved, it is, I think, probable that some firm would be found willing to undertake the manufacture on terms sufficiently favourable to Government.

I am doubtful as to the necessity for financial aid from Government. Capital has, I believe, been found for practically all the schemes for developing trade in Indian products,—coal, jute, manganese, timber, paper-pulp, etc.,—and would probably be attracted to any promising industry in minor forest products. Financial aid.

If it is considered necessary in any case for Government to provide part of the funds necessary, it would perhaps be best to provide part of the capital, Government to share proportionately in the profits. Some form of control would be necessary: possibly, the appointment of Government directors and Government approval to the auditors to be appointed. The supply of machinery and plant on the hire-purchase system might suitably be adopted in some cases, more particularly where the product is being exploited by Indian agency, *e. g.*, manufacture of rosha oil, catechu, etc.

As regards the principles to be followed in order to prevent Government aid competing with existing, or discouraging fresh, private enterprises, I do not think any Government aid should be given, if private enterprise is willing to step in and undertake the work without financial aid. Generally speaking, the policy of the Forest Department in the past has been not to work by departmental agency when private contractors are willing to do the work. In the Central Provinces and Berar, practically all forest produce is exploited by private enterprise, mostly Indian.

The available resources of the Indian forests are fairly well known at least in regard to products already commercially exploited, and I do not think a general survey is needed, but it would be necessary in the case of any new product to ascertain our available resources and what steps might be necessary to increase the supply of any product in the case of a large demand.

Exhibitions.

As regards the value of industrial exhibitions I am somewhat sceptical. The Forest Department has, from time to time, sent large exhibits at considerable cost to Paris, America and elsewhere, but I am not aware of any practical results in regard to industrial development. Provincial industrial exhibitions may perhaps serve some useful purpose, but for the best practical results they should, I think, aim rather at bringing buyers and sellers into contact than be of a popular nature. Central commercial museums to exhibit products available from the forests should serve a useful purpose, but the most practical way to develop trade in any particular form of forest produce is, I think, to get in touch with the firms trading in or requiring that produce in their manufactures and send them samples with prices and quantities available. Advertisement might also be resorted to. The resources of the Indian forests, if fully examined on scientific practical and commercial lines, could not, I think, fail to yield an increased quantity of material in the form of dyes, oils, tans, fibres, medicines, etc. etc., for use in industrial enterprises and the investigations now being carried out by the Esociet Company in conjunction with the Government expert, which have already led, I believe, to valuable and practical discoveries, indicate, I think, the general lines on which the Government experts I have advocated should work.

In general, I consider that in order that Indians may improve old indigenous industries and become more skilful in these and learn new industries, the facilities for technical instruction should be increased.

Institutions something on the lines of the more or less self-supporting Government Engineering School at Nagpur should lead to useful practical results.

With the increase of skilled knowledge, higher wages would be commanded, and this should lead to the improvement and elevation of the working classes and a higher standard of living.

Oral Evidence, 22nd December 1916.

President.—*Q.* You have called attention in your note to the possibility of the development of minor forest products and you have given illustrations of the possibilities of some of these. We have had brought before us in Calcutta, especially, cases of a kind that may occur more frequently in the future, where persons who wished to obtain certain plants or trees from Government forests for starting new industries found difficulty in doing so. Apparently, trees of the kind required occur comparatively in small numbers over large areas, or when an industry is new and the demand is small, the ordinary local contractors are not prepared to deal with articles of the kind on terms that the consumer can afford to pay. Can you suggest to us any way by which a difficulty of that kind may be got over? I am referring to India as a whole. Although you are the Chief Conservator in this province, you have been in many places, and you know more of India than most of the forest officers?—*A.* To take, first of all, the Central Provinces, suppose there is a demand for a species required for bobbins, or something of that sort. Most of these species occur here and there, and in these provinces the annual coupes are sold *en masse* to the local contractors who dispose of the timber, etc., in any form they like. The only way that I can see would be to arrange for the timber required to be removed before the coupe is sold, once it has gone into the hands of the contractor we can do nothing besides asking him to help. On the other hand, if it is only a small demand, it is undesirable to hold up the sale of a coupe because some firm happens to want a particular species.

Q. Is it possible for you to sell your coupes with conditions of that kind attached, so that the contractor might be obliged to get out these small quantities at rates adjudged to be fair by the forest officer?—*A.* I should think that the best way would be that we should put a clause in the agreement that certain species are not included in it.

Q. Then comes the difficulty as to who is going to take it out?—*A.* Then you come to departmental agency which is always a difficult thing. If there is a definite demand for a certain quantity we might say to the contractor that he must agree to supply a certain quantity under such terms and conditions as would be agreed upon.

Q. A particular instance we had from Darjeeling where there was a species growing more or less sporadically which was good for matches, and the difficulty was that the contractor who bought the coupes held them up?—*A.* If you let another man into the contractor's coupe there is likely to be trouble.

Q. Similar cases relating to minor products useful for medicine occur. They have a lot of information about the distribution of suitable species, and they were told by the forest officers that there was no way by which extraction could be effected in consequence of the fact that areas had been let to the contractor and no conditions laid down as to the contractor's dealing with these species. I suppose the purchasers of that kind are actually in the hands of the contractors who dictate their own terms?—*A.* If a contractor has bought the coupe he might ask a prohibitive price. It often happens that the produce is of more value in its original form. Take babool bark which is valuable for tanning. We have babool in Berar and there should be a large export of babool bark. But the fact is that the people get the same price for babool as fuel as they would get for babool bark, and that they get without any trouble. In case of definite demand we could arrange, if the species is there, for it to be extracted by Government agency.

Q. The difficulty in the initial stage is so great that no man who is actually prospecting for the species with a view to finding out its commercial value is able to say what his demand will be until he definitely establishes a manufacturing process?—*A.* Suppose you wanted a definite species which would, under the working plan, be felled in the following year, we should simply go and extract departmentally the quantity required. There is always a certain amount of difficulty in that the firms are not always willing to pay the real value. I remember years ago supplying bark of a certain species and so long as we supplied it practically free, the firm took it, but when asked to pay a price profitable to the forest department there was difficulty.

Q. You could not possibly reserve certain species when you are selling a coupe?—*A.* We do to a certain extent.

Q. Species which are known to your scientific officers to contain materials of special value apart from their value as timber?—*A.* We keep a number of the best species as seed-bearers and could keep others to meet a specific demand.

Q. Under the present circumstances I understand that your officers have so much to do in the work of conservation and administration that you have no time left to undertake the duties of extraction and in some cases, where extraction means the organisation of rope-ways, or light railways, or the development of roads, etc., you have not sufficient engineering knowledge to organise these methods of extraction?—*A.* This is to a certain extent true. A Divisional Forest Officer generally has a large area under his charge, and he has got the ordinary forest work, roads, bridges, annual reports, etc., etc., and he cannot undertake an unlimited amount of work. The question of forest engineering was discussed at the Board of Forestry this year. It seems to me that the arrangement that we have here is good. We have made nearly all our own roads. If we have got a difficult hill section to do, we have a right to call on the Public Works Department to make it for us. That settles the road question. Similarly, we can make nearly all our bridges such as we want. If we want a big causeway, we get the Public Works Department to construct it. If I want a rope-way, I know where to go to get it constructed. I do not think that in these provinces there is much work for an expert engineer.

Q. There is no doubt that for extraction your department is at present insufficient?—*A.* If we undertake extraction it means that the staff is not used on its purely legitimate work. If you add extraction duties on a large scale, the staff will have to be increased.

Q. That being so, problems connected with extraction, such as the development of roads and bridges are comparatively simple. But as regards wire rope-ways, it requires a certain amount of special knowledge for suitable projects being worked out for rope-ways. For light railways, again, it requires a certain amount of survey work, and for laying it economically and along the most suitable alignment, it would require a certain amount of special training. Development of saw mill and so forth as part of the extraction process would again require a certain amount of engineering knowledge. Do you think that it is advisable? I am putting it to you most specifically, to increase the number of ordinary forest officers, or to meet these engineering developments; do you think it is practicable to add to the Forest Service a line of forest engineers numerous enough and to grade them from assistant forest engineer to provincial forest engineer. The assistant forest engineer's grade would correspond to that of the assistant conservator and he would work on a parallel line to the ordinary forest officer. The senior man would be the right hand man of the Chief Conservator, and there would be engineers for the divisions and districts in the same way in the order of seniority, and you will have then, in effect, two parallel lines somewhat analogous to the lines that you have in the mercantile marine—the navigating officers and engineering officers. The navigating officers are, on the whole, senior to the engineering officers. The captain of the ship is senior to the chief engineer, but the chief engineer is senior to the 4th or 5th navigating officer. Which of these schemes would you prefer?—*A.* The whole question was discussed more or less by the Board.

of Forestry, and each representative of each province was asked to say what engineering works were likely to be necessary. Take this province. I know of no engineering work that is likely to need such engineers. If I wanted a saw mill I should get an expert saw mill engineer to design and erect one. If I wanted to lay a light railway I would go to one of the firms dealing with light railway. I might find it useful to have a consulting engineer to say whether the scheme is sound, but the idea that a forest engineer is going to do all these works seems to me somewhat impracticable.

Q. You say that an engineer who would advise would be useful?—*A.* My idea is that he would be a sort of consulting forest engineer. He would propose and suggest work. I do not want him to construct the railway and I do not want him to erect a saw mill.

Q. You want an engineer to see that Government is properly treated in all these projects that might be undertaken by separate firms. Above all, you surely want an engineer to indicate to you the projects that are desirable and feasible?—*A.* A consulting engineer would be alright, more particularly, in other provinces, he would be of great use, *e. g.*, in Burma, the United Provinces, in the Punjab and so on, especially in the Himalayas. There it is more a question of rope-ways, and he would be able to indicate whether they would be useful, if erected.

Q. Have you any idea as to how many engineers would be required, apart from the Central Provinces? How many would be required throughout the whole of the Forest Service in India? 30 or 40 engineers?—*A.* Take Burma first. There we have a number of eminently practical firms. They naturally study whether in any case a machinery would be of any use from the commercial point of view, but they have not introduced very much machinery. They have got to use elephants, and though elephant mortality is high and their prices vary from Rs. 5,000 to Rs. 7,000, and they are liable to be stolen from the Siamase side, they are using elephants in preference to anything else. Taking the whole of Burma, apart from saw mills, we had a big scheme for moving timber in the Rangoon depôt, but for that there have been various schemes brought up and a number of engineers have advised, and I do not think that the scheme has yet come to maturity. With my knowledge of Burma I could not mention off-hand any large number of works that would engage the attention of forest engineers. The firms themselves do not, I think, use engineers to any extent in the forests. In Assam we had a light railway. It was a hand tramway, and it was said that it was necessary because there were no carts, but it was not difficult to point out there were no carts because there were no roads. If you make roads the carts would appear soon enough. I am not prepared to suggest any form of mechanical transport that we consider necessary there. It is very easy to talk airily of the great advantages of mechanical means of conversion and extraction and so on. There are cases where rope-ways would work undoubtedly in the Himalayas. Frankly, I cannot say that there is a sufficient number of schemes to employ a large body of forest engineers. We have got one in Burma, but I am not sure what he is doing.

Q. You do not see any justification for anything like the number of engineers I have suggested?—*A.* There would be work possibly for one in the Punjab, one in the United Provinces, possibly two in Burma, one in Assam, although I am not quite sure of the work that I should put him on to. I do not know Bombay and Western Ghâts well enough. The question was considered at the Board of Forestry only this year, and it was put to each individual officer how many engineers he wanted. Each Conservator stated what he thought was necessary, and it probably came to what I have stated, that is, one for Bombay, one for Madras, one for the United Provinces, one for the Punjab, two for Burma, one in Assam, and we, in the Central Provinces, might have one. The exact statements are recorded in the Proceedings of the Board of Forestry.

Q. Supposing it was decided that your estimate was justified, how were you going to provide the four or five engineers? Would they be members of the Forest Department, or would they be borrowed from the Public Works Department?—*A.* It is very difficult to say. If we want any real advance in the methods of extraction we should get men from Canada and America where they are more ahead in that matter. I do not know of any institution here that could supply forest engineers.

Q. I suppose the ordinary engineer will soon get accustomed to forest conditions?—*A.* I think the best thing would be to have the cadre of forest engineers on a parallel scale. You could not possibly have them on the same scale, because the one is for administration and the other is purely for forest engineering.

Q. It need not be on the same scale. If you have a separate cadre for forest engineers with not more than four or five engineers, how are you going to deal with the question of their prospects and promotion?—*A.* You simply put them on the increment pay on the lines of the pay of Deputy and Assistant Conservators and it is then merely a question of appointments over Rs. 1,250 and upwards. They would have an increment pay up to Rs. 1,250, and then might be given one or two posts on Rs. 1,800 and 2,000. Undoubtedly, it would be a difficulty with so small a cadre to provide sufficient prospects of advancement.

Q. And in the earlier years you would have quite junior men?—*A.* You should have men who have had experience. He would not be obtained in the ordinary way as a forest officer is. He would have to be appointed on a pay of, say, Rs. 850 and should have had experience when he is appointed.

Q. Am I right in assuming that you think that something is required in the way of forest engineers beyond the present provision for it, but not on the scale that I have just sketched out to you?—*A.* We should want engineers to advise, first of all, on the suitability of a project, or to recommend one, and if it was for me myself, I would go straight to the firm which makes the saw mill for instance.

Q. You see room for the employment of four or five engineers, but not for the employment of 30 or 40?—*A.* Yes. Indeed, if you had 30 or 40, I do not know the work you could employ them on.

Q. Of course, a good man makes work?—*A.* Yes. You have to consider each work from the financial point of view also, whether it is going to pay, and, where the produce is of small value, if you put down a lot of capital you may perhaps never hope to see any adequate return on the money expended.

Q. Am I correct in assuming that at present your forest resources are well in excess of the extraction to such an extent that there is thirst in the country for forest products? Timber is high in value, even firewood is high in value and it is difficult to get at reasonable rates most of these ordinary forest products. Is that correct?—*A.* I do not think so. I have pointed it out in my written evidence. I have taken the products in their order. For major products, such as timber of good quality, practically all that can be supplied is in full demand. Take deodar. People often ask why does not the Forest Department supply our railways with sleepers? That question has been raised. Deodar is mostly what they are thinking of. The thing is that under the working plan so much deodar as is available to be extracted is put up to auction, if the seller is able to get Rs. 3 a cubic foot by selling it in large beams and scantlings, and he will not supply the railway with sleepers at Rs. 2-4-0 a cubic foot.

Q. But if there are greater facilities for extraction and transport it would not be impossible for both parties to be supplied with all their requirements. From your answer, it is clear that there is thirst for forest produce to such an extent that the man gets Rs. 3 or 4 a cubic foot and would not supply the railway?—*A.* At present in some areas, *e. g.*, Himalayas, the difficulties of transport and the cost of extraction make their working prohibitive. That is where a forest engineer might well be useful. One would first want to inspect these areas.

Q. It has been put before us several times that the difficulty of extraction and the cost of transport is standing in the way of the full development of forest produce, and you are not convinced that that is the case?—*A.* In each province there might be areas where if it were possible to formulate some scheme of cheap transport or introduce wire ropeways, you might be able to get produce out at a profit. It is sometimes difficult to get them out under the present methods. But cases are not so very common. Practically, the whole of the United Provinces is worked, I believe, save the new areas recently added. In Burma, right down to the Shan States, elephants work out the timber. One would like to know what the particular areas are. Where areas are unworked, it might be that they could not be worked at a profit, or it might be that the demand was not always sure.

Q. The forest economists have told us that there are many products that are not properly developed at present and they thought that it would be an advantage if the Forest Department had attached to the ordinary officers of the department a number of men with commercial experience to push, as I understood, forest products and to see that they were developed on business lines. Can you give your views on the question?—*A.* It was proposed in Burma when I was there that we should have a sort of separate service of men who would work on the lines of assistants in the firm of Burma Bombay Corporation, that is to say, they should know how to log and prepare timber in sizes most suitable to meet the market demands. In Burma there might be some scope for such commercial assistants. To take the Central Provinces, practically all the minor products of known value are disposed of. These minor products are known and I do not know what the commercial assistants would do particularly. The people here sell to the local people who again dispose of the produce to the known markets. I do not think that commercial assistants would be of much use in the Central Provinces. Practically all major and minor produce is disposed of at auctions or by leases to contractors.

Q. What I have gathered as the result of my monsoon tour is that there is a distinct feeling in favour of having forest engineers, but by no means a unanimity of feeling in favour of those so-called business men being attached to the Forest Department. It is generally supposed that it is much better that the forest officer himself should get into touch with the business requirements and even, if necessary, to increase the strength of the department so as to develop this business side?—*A.* Take this province. The forest officer has got to dispose of his coupes which he puts up

to auction. One man on the spot is required to do it and you would want additional men for every division. What I would much prefer to see is whenever you could make out a case for sub-division, to divide the areas both of Conservators and Divisional forest officer's charges. The Southern Shan States for example is nearly as big as England. Many of the Burma Division are much too large for adequate control. In the United Provinces the divisions are of a much more manageable size. The size a division should be, is largely dependent on the value of the forest growth.

Q. You think that there is no doubt whatever about the desirability of increasing the number of ordinary forest officers generally?—*A.* Yes.

Q. And that would pay?—*A.* It would pay. At the present time, if you want an increase on establishment it takes years as a rule, and finally it has got to go up to the Secretary of State for sanction.

Q. You are not satisfied that there is any real need for special men with knowledge of business methods?—*A.* Not I think in the Central Provinces; the produce, major and minor, available annually is sold in suitable sized areas to contractors, who arrange for the disposal of the produce to the people, and suitable markets.

Q. If you had these business men attached to the Forest Department, their point of view would be utterly different from the point of view of the Conservator who naturally looks to conservation as a matter of the first importance and disposal of products as the next thing. Would there be friction between the business men and the conservation officers?—*A.* Not necessarily. He would have absolutely nothing whatever to do with the amount of the outturn. The outturn is regulated by the working plans. It means that you only take the interest and do not impinge on the capital.

Q. The business man might want to make the Forest Department show a return which would be the instinct of a business man; it does not necessarily follow that it is in the best interests of the country?—*A.* The main policy of the Forest Department is to work immediately for the interests of the people present and future and profit is a secondary thing. We do not work primarily for profit, although I am afraid Government has been inclined occasionally to consider successful results from a financial standpoint.

Q. I take it from your note that the minor products are so numerous and varied that the scientific side of the research side of forestry in chemistry and possibly in economic botany is so great as to require a considerable addition to your scientific staff?—*A.* I should say undoubtedly.

Q. Do you think that it would be practicable to work a staff of that kind either as members of the Forest Department or by borrowing the services of specialists from the appropriate scientific departments?—*A.* I do not quite know the best way of doing it. What we want is more or less a whole-time staff, to ascertain how the known products can be better utilised or better prepared for the markets and secondly to experiment with the less known products which might yield some thing of value; it seems to me that there must be great possibilities, but the Government would take a risk in the matter no doubt.

Q. There are many forest products that are now exported that may be turned into manufactured products in India?—*A.* Yes, and they should be prepared in the best way for the market. The difficulty so often with products worked by the Indian is that he resorts to adulteration.

Mr. C. E. Low.—Q. Have you given any special concessions for match factories in Government forests?—*A.* Not in this province, within my experience.

Q. With reference to Kota Match Factory have you given any concessions?—*A.* I do not remember.

Q. You used to have a good deal of departmental extraction in the Central Provinces. Why was that given up?—*A.* On general grounds. The first thing is that it takes up the time of the forest officers which should be devoted to other work. The second thing is that the local contractors know what the people want.

Q. With reference to this question of Government extraction did you find it less profitable in cash?—*A.* If departmental extraction throughout India had been maintained, our revenues would have certainly more than doubled. Burma is a case in point.

Q. Leaving Burma aside, what about the other provinces?—*A.* When we undertook departmental extraction we extracted timber, etc., cheaply and sold it, as a rule, at a good profit. It is true that we occasionally lost money by the produce rotting, or by our not being fully in touch with the market. On the whole, Burma is the most important province where departmental work would have paid. I do not think it would make very much difference in the Central Provinces.

Q. Do you sell any species like, for instance, sal on fixed royalties in the Central Provinces?—*A.* In the Central Provinces the sal that we have at present is sold on lease to two or three firms.

Q. Do you charge a fixed royalty or sell the coupes?—*A.* In some cases we have sold the trees standing, but in cases where the lessees saw sleepers and scantlings, rates of royalty for the period of the lease are fixed.

Q. Your agricultural demand is very intense?—*A.* Practically the whole of the produce is consumed locally as timber and fuel apart from sleepers.

Q. The local agricultural demand is so intense that it has led to a considerable rise in prices locally obtained within the last 10 or 15 years?—*A.* You mean the prices that they give us or sell to the people? The prices that we get at auctions steadily increase.

Q. Any considerable exploitation of the forests of Central Provinces and Berar for external use would hit the local agriculturists pretty hard?—*A.* Yes, but we would be quite prepared to take protective measures. In the Central Provinces we look very carefully after the interests of the agriculturists.

Q. It is taken special care of by special revenue officers in connection with the working plan?—*A.* Whenever we introduce a working plan we have the provisions of the plan examined by a civil officer to see that the requirements of the people are provided for, more particularly in regard to grazing, and also timber for the agriculturists.

Q. You do not find much stuff left over in your coupes?—*A.* They are generally pretty well cleaned.

Q. Turning to the question of forest engineering was it not the case that some years ago a forest official purchased an engine for the Alapillai forests under the impression that it included a boiler and found afterwards that it did not?—*A.* Yes, there was also another case? A very keen and enthusiastic forest officer obtained sanction of the Government to the purchase of a road tractor which was afterwards found to be unsuited to forest work.

Q. That is comparatively a recent case?—*A.* Yes. The difficulties that were not realised were that it had to be used on a road some seventy miles long, and in the hot weather it became so hot that no native could stop in the cab, and it required water and fuel at frequent intervals.

Q. There was a discussion so far as I remember from about the year 1902 until 1907—what happened then I do not know—about the desirability of constructing a light railway for the extraction of topola sal?—*A.* There is an excellent road going straight through the place. I should doubt whether a railway would pay. I know something of mono rails.....

Q. The scheme was considered with a lack of expert knowledge and nothing came out of it and they are still continuing to move the timber over sixty miles of road. Do you think that some form of light railway would have been profitable there?—*A.* I doubt it. It would not leave a sufficient margin if you put in a railway with all its attendant cost of staff apart from the initial cost it would involve.

Q. You have also taken into account the fact that many other forest products may be available which are not now exploited such as bamboos?—*A.* Yes, I should be very glad to have the advice of a consulting forest engineer occasionally. But if he made a good scheme I would not have him to do the work. I recommended a ropeway in the Melghat to bring timber out which might suitably be done by a ropeway.

Q. If you put in a scheme like that in the absence of a forest engineer, before they accept your dictum, they would probably send it to the Public Work Department?—*A.* I think on those grounds there is a good opening for a forest engineer and besides we want to move with the times in any case. The forest engineer who would be a specialist in the subject might give us much valuable advice.

Q. Don't you find in practice that the Local Government do not accept with confidence any proposals of this kind put up by forest officers without special engineering knowledge?—*A.* As you say, it is sent to the Public Works Department for criticism and they might not have any special knowledge of that particular work, and certainly any proposal would be much more readily accepted by the Local Government if it had the expert forest engineer's support.

Q. Similarly, when you get a scheme put up by a reputable firm for a light railway, the Local Government may want to know whether the thing is a suitable one and in that case the consulting forest engineer would be of use?—*A.* Undoubtedly.

Q. As regards the question of the availability of forest products, was it not the case that there was an immense increase in the output of bamboos and of minor species owing to the Satpura railway passing through Balaghat up to Katangi?—*A.* With out reference I cannot give the exact figures, but undoubtedly all our development depends upon that. Directly railways come in, we may make feeder roads to it and the advent of railways always means increased extraction.

Q. Do you think that some thing of the light railway type running along the edge of the forests and coming down to the railways at intervals would make a tremendous difference

in the amount you would be able to extract compared to carting in a rough country?—*A.* That would be possible, but whether it would pay must be decided by examining each special case.

Q. By what agency?—*A.* It would be a case for the forest consulting engineer.

Q. Take Hoshangabad, for instance. There you have got forests parallel to the railway at a distance of from five to twenty miles. Take the southern portion of Balaghat division and you have the same thing there with large areas of bamboos?—*A.* Yes.

Q. Would it not come out a great deal cheaper to the consumer?—*A.* Yes, but whether it would pay for laying a railway is the point.

Q. Don't you want an expert staff to be able to deal with such questions?—*A.* I think one consulting forest engineer should suffice.

Q. Supposing you have got an expert and put him on one or two things and he says that they have worked all right, then you can do something in that line?—*A.* Yes.

President.—Q. You first of all said that the forest were being worked to the full and yet you afterwards said that if railways were developed in the forests, you would get greater extraction?—*A.* I do not remember saying that forests are being worked to the full. There are plenty of areas not worked at all.

Q. For want of means of communication?—*A.* Want of demand. There are a number of reasons. There may be large areas of malguzari forests. The malguzars are not conserving their forests to any extent and they compete with the Government forests.

Q. They would not compete if you had better means of communication to bring your forest products to wider market? You have also told us that the Shan States were being worked all over. There are only two railways?—*A.* I said large areas in different provinces are not being worked. They are working and endeavouring to do something in the Shan States.

Q. The Shan States were tied up actually for want of railways?—*A.* But the only paying way to get timber out of the Shan States is the present way to float it down the rivers.

Q. But you want lines to assemble it at the Salwin?—*A.* That is practically done by elephants.

Q. Your elephants might assemble them at points conveniently where you can put up a light railway and assemble your material and transport them through the river. Surely that would be better?—*A.* The manner in which the timber is worked is that the elephant first of all drags it to the floating stream which is dry in the cold weather, and when the rains come on the stream becomes full of water, the elephant with its tusks helps the timber down the floating stream. A number of elephants drag the timber and finally it gets to the bigger stream and so on to the main river. The cost of extraction is very small.

Q. You do not think it may be improved by developing railways to assemble the timber at the river banks straight instead of having to be taken on these intermittent tributary streams?—*A.* It would not, I think, be practicable.

*Hon'ble Sir R. N. Mookerjee Q.—*Have you had Government teak forests in the Central Provinces?—*A.* The only available teak forest from the point of view of size and good quality is the Alapillai forests in Chanda, but practically throughout the whole of the province we have teak which however does not grow to a great size and is used by the people in the form of poles and scantlings.

Q. What steps are taken to let the outside people know that there is teak forest in the Central Provinces that can be utilised?—At present the Alapillai teak forest is being worked by Bombay firm who have erected at Chanda a very up-to-date saw mill, and they supply the Bombay and Calcutta markets.

Q. As regards the system of auction, you auction a certain number of trees to be cut by the men from the jungle?—*A.* Yes.

Q. The trees which are marked by your rangers?—*A.* Marked by our staff or rangers. We train a staff for this.

Q. Is it a fact that you have the same people without attracting any outside people to bid at your auction?—*A.* No. They vary very often, generally local men who have been working and who know.

Q. Would it not be more important both from the point of view of the Forest Department and the public that these timbers are felled and brought to a certain depôt and then auctioned generally, as it is done in Burma?—*A.* No. The primary requirements of this province are to supply the agricultural people with their needs in the shape of timber and fuel, and the consumption is mostly within the provinces.

Dr. E. Hopkinson.—Q. Do you think that the rivers in India could be further utilised for floatation purposes for forest produce?—*A.* I do not know. As a rule where there are roads and railway communications, the preference seems to be for them. In Burma all

the extraction is practically by water, from Upper Burma right down to Rangoon, and similarly from the Southern Shan States nearly all the timber comes down the Salwin. The Brahmaputra is little used.

Q. Are there not many cases in the Himalayas, where road and railway transport is not available?—*A.* In the Himalayas, deodar sleepers are already floated down the river. I think that that system is applied to other things also. The method of using water transport wherever possible seems to be fairly common. They do use waterways considerably in the United Provinces, Garhwal and elsewhere.

Q. Putting the question in another form are the existing surveys of the waterways of India sufficiently complete to enable the Forest Department to say whether they can be used or not?—*A.* I should think so. Every local man knows where the local rivers are.

Q. By survey I do not mean the geographical course of the river?—*A.* But then the local officer is fully aware of his existing water communications.

Q. He is aware of the existing waterways, in his own particular district, but he does not know what happens to the communications when they get below his own district?—*A.* Where it seems natural to use water communication as in Burma, every officer knows the whole set of communications in Burma. He is concerned with his own local rivers until they meet the Irrawadi.

Q. You know there are provinces where much is known about waterways as in Burma?—*A.* I think so. Much is known, but probably it is not considered as a suitable means of transport.

Q. You say that as far as you know no further use can be made of rivers for floatation purposes?—*A.* I do not know of any particular cases where waterways, if they were really suitable, had not been utilised or tried. It is a rather big question.

President.—Q. Is it not the fact that rivers in India are mostly intermittent and that actually interferes with the question of river transport seriously?—*A.* Yes. But surely there is river transport going on all over India at favourable times. In the Nerbudda the produce goes down in country boats. The Central Provinces are almost unique in the distribution of forests. In every district in the Central Provinces there are Government forests.

Forest products are sold by auction?—*A.* Prior to selling by auction the Government used to work departmentally in nearly all these things, brought out timber, etc., and established the trade and then handed it over to private enterprise. In certain parts of the United Provinces for years all the sleepers were cut and extracted by Government.

Q. It is being done now in the United Provinces in Kumaon?—*A.* Perhaps to lead the way.

Dr. E. Hopkinson.—Q. Supposing you had a staff of consulting engineers such as we have discussed, would you desire to put some of the engineers on to the problem of considering waterways further from the floatation point of view?—*A.* Yes. It would come within the sphere of their work, more particularly to examine them to see what obstructions required to be removed.

Q. It would be advantageous to have such a corps of engineers?—*A.* Yes. I think that consulting engineers would be very useful. There would be more scope for them in the other provinces than in this province.

Q. Should they be an integral part of the Forest Department, or should they be taken from an Imperial service of engineers?—*A.* I think that they had better be on an Imperial cadre of their own.

Q. Such as you suggest for experts for research?—*A.* These are the gentlemen to whom I attach more importance.

Q. Supposing you have such a corps of engineers, would you have them on parallel lines to the experts or as an integral part of the Forest Department?—*A.* I should rather think that they should be a separate cadre.

President.—Q. Have you any supplementary remarks to make?—*A.* I have already referred to the question of utilisation of experts and I have noticed the lines on which it should be done. I refer to the Government Engineering School only as a small means of showing what practical results are obtained, how directly an Indian can do anything, not merely talking, but can do something practical, his value immediately goes up. A case occurred to me the other day where a man who has not even been through the Engineering School but happens to know something of motoring and his ordinary wage would be Rs. 8 or Rs. 10 is at once given Rs. 20 or Rs. 30. That I quote with reference to the advantages of technical education. As for the other industries, I think there are a lot of industries that are likely to be developed and can be developed. Take for example, paper mulberry. Experiments were made in Dehra Dun years ago. In a five years' rotation you could obtain any amount of paper material. There are a number of things that we have made preliminary investigation into and if we had experts we could do a great deal.

WITNESS NO. 161.

*Mr. P. C. Dutt, Bar-at-Law, President, Municipal Committee, Jubbulpore.**Written Evidence.***Financial aid to
industrial enterpri-
ses.**

Q. 1.—I have had experience in the raising of capital for various industrial enterprises, the most important ones being the Katni Cement and Industrial Co., Ltd., the Sleemanabad Copper Company, the Jubbulpore Manganese Company, the Sheelachmanpur Diamond Mining Company, the Indian Bauxite Corporation, and the Jubbulpore Steatite Company.

I have had great difficulty in raising funds for some of the industries in which I am interested.

The difficulties are that Indians are not educated enough to understand or foresee the complex problems involved in the development of a new industry in a country which chiefly depends on other countries for manufactured articles.

Most of the European merchants in India are mere middlemen whose prosperity depends on the goodwill of the export firms of Europe and other countries for whom they principally act as agents.

Generally the members of the European mercantile firms come to India when very young and have to stick to their work till they retire. They have neither initiative nor facilities for investigating and then risking money, time, etc., on new ventures.

I have found that firms in England are too occupied in carrying on their well-established businesses and are not inclined in the least to look into any proposition concerning Indian industries, and their chief arguments when refusing to consider an Indian proposition are that "If it is really so good as you represent, why don't the Indian and English people in India who are familiar with Indian conditions invest their spare capital in such a proposition;" and others who are interested in similar businesses as proposed shrug their shoulders and say, "We are getting all the profits we want in exporting our manufactured articles to India, and why should we risk our capital by building factories in India and sharing profits with people there who possess the raw materials, etc?"

In my opinion the present war will cause a change in the views of English people and Indians for the better. No one can force people to change their views, and therefore I cannot make any suggestion except that English people may be taught when at school all about Indian conditions and business prospects.

Q. 2.—Capital is generally drawn from Indian and European mercantile communities.

Q. 3.—I do not know of any such enterprise.

Q. 4.—I have had no experience of Government assistance to any industrial enterprise.

Q. 5.—(4) I recommend Government loans with or without interest.

(5) Also supply of machinery and plant on the hire-purchase system.

(6) Provision of part of share capital of companies on the same basis as public subscription of capital.

(7) Guaranteed Government purchase for limited periods.

I disapprove of (1) Money grants in aid, (2) Bounties and subsidies except to compete against enemy and rival countries' products.

Q. 6.—If the Government lends money or supplies machinery or subscribes part capital, it should have a certain amount of control.

Q. 7.—I have had no experience of any Government pioneer factories.

Q. 8.—The Government should help to establish and pioneer all such industries concerned with the manufacture of munitions, articles required for railways, telegraph and all other Government requisitions which are now imported.

As soon as pioneer industries are firmly established, they should be handed over to public companies.

The Government under no circumstances should be allowed to become the permanent owners of such enterprises.

Q. 9.—Almost all industries in India are hampered, because the financiers take the lion share of profit of most enterprises.

Generally the financiers of Bombay manage to get hold of about three-fourths of all prospective profits of any new industries. This retards the development of many promising industries in this country.

Q. 10.—I can only suggest that industrial banks may be started on the principle of the agricultural co-operative banks and societies.

Q. 11.—Agriculture.

Q. 13.—Government aid should not be granted where it would discourage fresh private enterprises unless the existing enterprises were in a moribund condition.

Q. 14.—There should be no limitations on Government aid to a new enterprise, even if it competes with an established external trade.

Q. 15.—I have had very little experience of technical aid from Government experts in establishing my enterprises.

Technical aid to industries.

Q. 16.—In my opinion the Central Provinces manganese and the Tata iron industries have been benefited by the research work conducted by the Geological Department of the Government of India.

Q. 17.—The Government should always lend available experts to private persons, firms or companies on easy terms.

Q. 18.—The results of the researches made by Government paid experts should not as a rule be published without the consent in writing of the private persons, firms or companies on whose behalf the experts were engaged; otherwise in my opinion it would be nothing short of breach of trust.

Q. 19.—In places where a particular industry is being worked, but not satisfactorily, the Government should open demonstration factories.

Q. 20.—Demonstration factories should be established in Central Provinces to manufacture glass, also porcelain, earthenware, namely, dinner and tea sets, etc., and various kinds of oil by up-to-date machinery.

Q. 21.—From 1904 I have always received the greatest kindness and assistance from the technical department of the Imperial Institute, and it is only due to the institute's assistance that I have been able to successfully carry out some of my important industrial schemes, namely, The Katni Cement and Industrial Company, Limited, and part of my bauxite scheme.

Its advantages are very great and numerous, for instance, an impartial and correct judgment is given after careful consideration of every factor regarding a new and proposed industry, and the investigations are always very thorough and up-to-date. The imperial knowledge of the institute is very great and therefore it has the greatest facilities to judge correctly of the possibilities of projected industries within the Empire, and especially with regard to India, which has no independent official trade relationship with any other part of the Empire.

Its disadvantage is that it is starving for want of proper financial aid from the British Government, India and the Colonies which makes it shorthanded, and consequently there is sometimes delay in research work. In my opinion the Imperial Institute holds the unique position of great trust to the Empire and especially to India, whose princes and people collected a very large sum of money to build it.

Q. 22.—Yes, there should be provision for research work for special subjects in England under the scientific and industrial research department established by the British Government.

Research on any important chemical and allied subjects should be carried on in London, because the best and most experienced scientific men, proper laboratories and appliances are available there.

Q. 23.—The Advisory Council for Research in the United Kingdom would be the proper authority to direct all research work for Indian industries.

Q. 24.—I think that there is no college in India which is competent enough to handle properly any research work as is being done in the United Kingdom.

Q. 25.—It requires a thorough survey to further develop the agriculture, forest mineral deposits and their attendant industries.

Q. 26.—It should be organised by the present Imperial Departments, such as the Geological Survey of India, Forests' Research Department and the Government of India, Agricultural Department.

Under the directions of these Imperial Departments each Local Government should organise their own special survey department. Their precise objects should be to develop the production of raw material and to find out an outlet for the same in this country and abroad and, if possible, start industries to manufacture goods from raw materials, etc.

Q. 27.—The results should be made known as soon as possible to the various parties interested in the particular industries and to place them before the Government officials, whose duty should be to give aid in starting or promoting industries in India.

Q. 28.—They are very useful to all concerned.

Assistance in marketing products. Q. 29.—In my opinion commercial museums should be developed and increased in number. They should be located in any commercial town of importance or towns having over 50,000 Indian inhabitants.

They should be worked under the direction of the Director of Industries for the province, the local executive officials, the municipal committees and district councils.

Q. 31.—In my opinion industrial exhibitions are of real value to educate our people.

Q. 32.—The Government should encourage such exhibitions and should take active part in them.

Q. 33.—These exhibitions should be popular in character and also aim to bring buyers and sellers together.

Q. 34.—There should be trade representatives for India in Great Britain and foreign countries, and the Colonies.

These trade representatives should be business men and be under the Consular Service. Their duty should be in every way to promote the welfare of Indian industries, sale of raw materials, to promptly report and advise on all fresh developments and new inventions on all industrial matters which might directly or indirectly benefit Indian industries or help to dispose of raw materials in suitable and advantageous markets.

Moreover they should constantly report confidentially all trade developments which might benefit India. They should be subjects of His Majesty, but not naturalised alien subjects. Special commissioners should be appointed from time to time.

Q. 36.—Yes.

The Local Government should arrange for these representatives.

Q. 37.—Yes, they should do both.

Q. 38.—At present the Government departments do not carry out the rules relating to the purchase of stores from Indian markets.

These rules should be rigidly enforced and their non-performance should be severely punished by the Imperial Departments and the Local Governments concerned.

Q. 39.—The co-operative societies or proposed industrial banks should help in the matter, of course with the assistance of the trade agents.

Other forms of Government aid to industries.

Q. 40.—During war and famine times.

Q. 41.—It is difficult to promptly secure land in this province for industrial purposes, and sometimes the Government gives preference to agricultural purposes to any prospecting for minerals.

Q. 42.—The Government should always help in every way possible by granting on nominal terms land for establishing new or for the development of existing industries.

Q. 43.—It is very defective and it requires radical amendments.

The law should be simplified so as to give the courts a free hand to promptly acquire lands for industrial purposes.

During the settlements of villages in Central Provinces the Local Government should be empowered by the revenue law to enter into agreements with the lessees of the villages that in future all land required for industrial purposes should be given at a fixed rate of compensation.

Q. 44.—I have tried to improve labourers' efficiency and skill by making them petty contractors in manganese and bauxite mining. I found that they greatly improved.

Q. 45.—(a) Labourers' efficiency and skill can be generally improved by increasing their daily wages and gradually inducing them to become mates of gangs of labourers and ultimately petty contractors; but above all they should have some elementary education.

Q. 45.—(b) The same suggestions will apply to the mining of manganese, bauxite, diamonds, coal, etc. In these mining industries I have had considerable experience.

Q. 46.—I have had no experience about the training of apprentices, etc.

Q. 47.—I have had no experience about industrial schools.

Q. 48.—In my opinion better results would be obtained by apprenticeship system, without which theoretical education in an industrial school is absolutely useless. I should suggest that when a person has finished his apprenticeship he should go through a course in an industrial school, but this is not absolutely necessary.

Q. 50.—The industrial schools should be primarily under the Department of Industries, but the financing and general control should be with the Department of Education.

Both these departments being under the Local Government, I see no reason to suspect that there would be any friction between them.

Q. 51.—They should have some sound general education and apprenticeship in the particular business which they wish to take up.

Q. 52.—There should be technical scholarships open to these men for studying in foreign countries.

Q. 53.—Such firms should be compelled to train technical experts.

Q. 54.—It would be better to have uniform tests in the standard of examination for mechanical engineers for the whole of India.

Q. 55.—The law for the Central Provinces requires qualifications for an engineer, etc.

Q. 56.—The Department of the Commerce and Industry and a Director of Industries and Agriculture. General official
administration and
organisation.

I think the Director of Industries should be a man experienced in business, and not merely a civil servant. The present arrangements are radically wrong and useless for the purpose of promoting any other industry except agriculture.

Q. 57.—I do not think a Board of Industries for these provinces would be of much use towards the future development of industries.

I am against such a board in any form for the Central Provinces.

Q. 58.—I do not advocate for the Central Provinces an Advisory Board.

Q. 60.—There should be a Director of Industries for the Central Provinces.

He should be a man of business experience with some scientific education or knowledge; he need not be an expert on any particular subject, but he should know the people and local conditions thoroughly, and he should have lived at least ten to fifteen years in the Central Provinces or in India.

Q. 61.—I am against the formation of a Board of Industries. The Director of Industries should be under the Local Government.

Q. 62.—There should be frequent and free exchange of information between all the Directors of Industries in India, and they should meet in conference at least four times a year in different parts of India.

It is practicable to form an Imperial Department under a single head. The department's functions should be to correlate the works of all Directors of Industries, industrial bodies and everything concerning industries. It should be the medium through which all research work in foreign countries be organised and be the controlling authority of all trade representatives and technical students abroad.

Q. 63.—The only technical and scientific work which is done as far as I know is by the Agricultural Department and by the chemist attached to it.

Only lately some efforts are being made to improve scientifically agricultural industries. It is difficult to suggest briefly any recommendation.

Q. 64.—I recommend Imperial Departments.

Please refer to my reply to questions Nos. 25 and 26.

Q. 65.—Please refer to my reply to question No. 62.

The officials of this department should be trained scientific men recruited from any part of the world or from India according to the qualifications required to fill such posts.

Q. 66.—The head of the department should have almost absolute power of control subject to the supervision of the Government of India in Council.

Q. 67.—For the time being he should be entirely under the control of the Director of Industries; of course the Local Government should have supervising power over him.

Q. 68.—Please see my reply to question No. 25.

Q. 69.—Under the direct control of the Director of Industries.

Of course under the supervision of the Local Government, but under the final control of the Imperial Departments.

Q. 70.—On a good salary and a bonus if good results are obtained under the said expert's guidance.

Q. 71.—All such institutes should work together, and not as independent units.

Q. 72.—It would be better for each institute to confine its energies to deal with a limited group of allied subjects.

Q. 73.—Yes.

Imperial control.

Q. 74.—Yes, it is desirable that strong measures should be taken to co-ordinate and prevent unnecessary over-lapping of any research work. I can but quote from the conclusion of the Report of Advisory Council of Scientific and Industrial Research of England for 1915 and 1916 :—"First, a largely increased supply of competent researchers; secondly, a hearty spirit of co-operation among all concerned,—men of science, men of business, working men, professional and scientific societies, universities and technical colleges, local authorities and Government Departments. And neither condition will be effective without the other."

Q. 77.—They should be given facilities of leave and full pay to study abroad under the directions of either the Imperial Institute or the scientific and industrial research department of England.

Q. 78.—The difficulties are very serious. In provincial towns of India there are no technical or scientific libraries for reference work. I have always to procure books from Europe and America for my use, and I have to wait sometimes four or five months for a book or a journal.

Q. 79.—Yes, every Government college in large towns should have a complete and up-to-date library containing all scientific and technical books, including patent journals other current technical papers, reviews and journals for references. These libraries should be open to the public on application.

Q. 80.—Certainly not.

Q. 81.—I do not think that a college of commerce could in any way assist in the development of any local industry.

Q. 82.—Yes, the statistics are neither comprehensive nor up-to-date. It is very difficult to get any statistics on many important subjects. There should be improvement in collecting statistics, tabulating and making them full and up-to-date. These should be published oftener.

Q. 83.—Same as 82.

Q. 84.—None.

Q. 85.—Yes, but they should consist of the latest information collected by the foreign trade representatives, Directors of Industries and experts under them.

Q. 86.—My reply is the same as to question 85.

Q. 87.—Monographs are useful in placing local information at the disposal of any investigators of the particular subjects.

Publications by the Geological Department are of great use for the development of mining and allied industries, but the publications should contain more information regarding the commercial interests than scientific work. I suggest that the procedure adopted by the United States' Geological Department may be followed with advantage. The records of the Geological Survey should be published oftener than usual.

Q. 88.—Please refer to my reply to question 85.

Q. 89.—Yes, fibres, indigo, wheat, oil-seeds and other agricultural produce. Some should be compulsory, others voluntary. Other forms of Government action and organisation.

Q. 90.—The Imperial Agricultural Department jointly with the Collector of Customs should organise the testing and certifying.

Q. 91.—Yes, drugs, fibres and some agricultural produce.

Q. 92.—Inspectors to examine and prosecute.

Q. 93.—When misdescription of goods is found, the goods should be confiscated and the owners fined.

Q. 94.—The Indian law for trade marks and trade names is very defective.

Q. 95.—The patent laws applicable to India are radically defective.

Foreigners take out patents not to work but to prevent others establishing similar industries in India. The patent laws should be applicable to the Native States and the laws should be just the same as in England.

Q. 96.—No.

Q. 97.—More railways, roads with culverts and bridges are needed in the Central Provinces.

Q. 98.—Yes, the railway freights should be lowered in the case of new industries which might consume large quantities of coal, acids and other imported goods to the following rate—one-fifteenth of a pie per maund per mile.

The same rate should be applicable for minerals which cannot be profitably utilised in this country, and have to be exported.

Q. 99.—Yes.

Q. 100.—I do not think so.

Q. 101.—The external trade is very seriously handicapped because of the high shipping freights. The remedy is apparent, namely, building more steamers.

Q. 102.—Very little.

Yes, in the Central Provinces and the adjoining States of Rewah, etc.

Q. 103.—I think the Local Governments should be given a free hand to renew prospecting licenses up to five years, when the Government is satisfied that *bonâ fide* prospecting has been done and that for reasons beyond the control of the prospector the prospecting licenses could not be matured into mining leases.

Moreover, very large powers should be given to Local Governments to reserve for any prospector large tracts of mineral deposits for the development of new industries, about which the prospector by his diligence, perseverance, foresight, expense, influence and experience, formulated and proved the possibilities of a future promising industry.

The Local Governments should be allowed to grant prospecting licenses without any surface rent payable by the prospector.

The terms for mining leases require revision regarding the payment of dead-rent, which is generally fixed very high for a new industry; preference should be given to prospecting and mining to agriculture. The forfeiture for not working the mines after the first year of lease requires radical alteration.

Q. 104.—Yes, there are some, which are well known to the Government.

Q. 110.—Half from the Government.

Q. 111.—Yes, Soda, Alumina, Aluminium and various chemicals.

Q. 112.—Bauxite. The difficulties are want of capital and the past inability or neglect of our Government to prevent German and other foreign exports to India to compete against British manufactured articles, in this case aluminium metal utensils, &c., and sheets and ingots.

Oral Evidence, 22nd December 1916.

President.—Q. You say in that the Central Provinces demonstration factories should be established to manufacture glass, porcelain, earthenware and various kinds of oils. Do you think that in the case of earthenware Government should have a demonstration factory?—A. Yes, none of the pottery companies, such as Messrs Burn & Co., Limited, would take it up as they said that skilled artisans were necessary who would be able to modify their systems to the local conditions. I, in conjunction with the Bombay Mining and Prospecting Syndicate, fully investigated this matter in England and we came to the conclusion that it would be quite feasible to start an earthenware industry in this district.

Q. If it is quite feasible why not go ahead with it?—A. I have ceased to have any connection with the Bombay Syndicate. Since it formed the subject of one of the questions issued by the Commission I advise that the Government might start a demonstration factory.

Q. If you have severed your connection with the Bombay Syndicate that leaves you free to take up the thing and go ahead?—A. One of the questions was whether there were any industries that Government might take up and that is my reply. I have not treated it as a personal matter.

Q. There is no use taking up a thing which has been found to be feasible and which can be taken up by private individuals?—A. Because private individuals have not taken up the thing, I suggested it. I am otherwise full up. I think that Government should come up when no one is ready to come forward.

Q. In other words you have given up the idea of doing it?—A. I have no spare capital now, otherwise I should start it myself. I am going to ask the Government of the Central Provinces to take up this industry.

Q. In answer to question 87 you say that the procedure adopted by the United States Geological Survey might be adopted with advantage. What is the exact procedure?—A.

Mr. R. Mitra.

I think that they have a better system of reporting on the economic side of the geological possibilities of a country, whereas here the scientific and the economic questions are mixed up. I have studied the United States Geological bulletins for some time. They have a more elaborate system and they give one a very good idea as to what minerals could be taken up profitably, its economic value and valuable informations regarding its uses and manufactures, etc. I do not say that the system should be copied, but I thought it might be followed in some ways.

Q. The question really turns on the strength of the staff?—A. I know that our Geological staff is poor. Our staff will have to be increased. I know this quite well.

Q. Do you think that the staff should be increased as to admit the publication of information regarding the economic side as well?—A. Yes, probably four times the present staff might be required and certainly should be provided for.

Mr. A. Chatterton.—Q. Could you tell us something about the Indian Bauxite Corporation?—A. It is a corporation composed of the aluminium trusts of France, the late senior partner of Messrs Jardine, Skinner & Co., of Calcutta, myself and in England two other friends. In the beginning I had technical help from the Director and Dr. Henry of the Imperial Institute. The idea was to manufacture aluminium by a French patented process; full information about which I have placed with Dr. Hayden of the Government of India, and the Commerce and Industry Department. Just before the war we arranged to form a company in France with half a million pounds capital to work my bauxite areas; the approval of the Secretary of State for India was obtained. Everything was ready and just at that time War was declared; there the matter remains and I do not know when it will be realised.

Q. Is the scheme simply hung up on account of the War. Afterwards do you propose to go ahead?—A. That is certain as far as I can see. They have not got the men for it now. It is an altogether new process and requires new and complicated electrical plant which cannot be fitted up by anybody even in England, so I must wait for the assistance from the French people. The Government of the Central Provinces and Sir Benjamin Robertson know all about it.

WITNESS NO. 162.

Mr. R. Mitra, A.M.I.C.E., Superintending Engineer, Public Works Department,
Central Provinces (Retired.)

Written Evidence.

Introductory.

Qs. 4, 11 and 56. —The industrial life of the province is synonymous with its agricultural life. There has been marked activity in recent years in mining enterprise, and such excellent factories as the Empress Mills of Nagpur, the Pottery Works of Burn & Co. of Jubbulpore, and the Cement Works of Katni denote a high order of industrial achievement. Yet the vast resources of the province remain untouched and it stands to day as it was, pre-eminently agricultural. As in other parts of the world, manufacturing industry, rather than agricultural, must raise the fabric of economic advancement. A new force of industrial activity must arise before any real progress can be made; for the manifestation of this force our hope is centered in the co-operative movement which Government has so thoughtfully inaugurated. In the words of the Act this movement aims at the promotion of economic interests in accordance with co-operative principles. A distinct and very encouraging advance has been made in the direction of agriculture; but what little has been accomplished on the non-agricultural side is most disheartening, for the rustic societies are destined, before long, to be overwhelmed by the increasing pressure of modern industry. The young co-operative plant has to be trained to spread and grow, slowly but vigorously, in more directions than one; and the Government and the people must join hands in feeding its roots and aiding the development of leaf and bud with fostering care and vigilance.

Preliminary Survey.

Qs. 25 to 27.—The preliminary surveys for industrial purposes must be conducted by Government. The Director of Industries has, I believe, collected valuable information regarding the available resources of the province. Facts and statistics in this connection cannot be brought together in an accurate and useful form by any other agency. The Director is a high officer of Government of proved capability and weighty experience. He is in touch with local officers and has at his command official records in all branches of the Administration. He has thus every facility for compiling and maintaining up to date a careful and systematic record of all that is known on the subject. An annual memorandum on the precise industrial position of the province drawn up by him would prove of inestimable value to the investing public.

Much of this information lies on the surface. Even a week-end tourist, if so inclined might gather facts and notions for himself with astonishing rapidity. Round about Jubbulpore, for instance, will be found the extensive flourishing Pottery Works of Messrs. Burn & Co, whose skilful management has produced the only profitable industry out of the "Gondwana" clays of Jubbulpore; another similar factory which is struggling for its existence for want of good management and efficient machinery; a tolerably successful cotton mill, being one of the three or four of its kind which have come into being for the utilisation, in an infinitesimal measure, of the produce of the immense cotton tracts of the province; an insignificant looking factory of glass-ware possessing elements of great productive value but perishing as a result of impoverished capital and nerveless effort. A short afternoon drive towards the Mandla range would take you to the hamlet of Barela, a typical *entrepôt* for the export of vast quantities of myrabolams of good quality known as the "Jubbulpore myrabolams," which might form a nucleus for the growth of important tinctorial and tanning industries. It would, moreover, give a bird's-eye view of the picturesque basin of the Nerbudda and that of its tributary, the Gour, wherein the possibilities of hydro-electric power might be found awaiting investigation. The heavy traffic on the road would draw pointed attention to the need for railway feeder extensions in this province. A couple of hours' railway journey from here would take you to Katni where there are clustered together a number of industries varying from the crudest forms of manufacture of lime and mineral pigments to the highest and most up-to-date processes of cement and pottery works. The capacity of these excellent cement works is largely below requirements and the pottery branch is exhibiting symptoms of failure, because it is placed outside the Gondwana formation. A few hours' further journey would land you in an atmosphere of noxious gases from the slaughter-yards of Damoh, wherein one might discern the germs of a great and prosperous leather industry. A similar journey southwards would afford you the opportunity of examining the very useful match factory of Kotah which is languishing for want of adequate support and wood of the right description.

Promotion of Industries.

Qs. 56 to 61. —A preliminary survey such as outlined above merely furnishes an indication of what is *possible*. The next step is to determine what is *practicable* and likely to prove *remunerative*. This brings us on to the stage of investigation and acquisition of special and more comprehensive knowledge which paves the path for "promotion." This stage is of the highest value in industrial progress. It is at this stage that the seeds of success or of failure are sown. It represents the great period of "waiting" which might occupy months or years of arduous labour before any benefit in return could be hoped for. An enterprise which passes successfully through this period of toil and responsibility emerges full of the richest promise. Absence of this stage or its precipitancy, on the other hand, spells failure.

There is no organised agency in this province with the requisite capital and business capacity for "promotion". Capital and business capacity are as essential for promotion as at the ultimate stage of working and proceeding to earn profit. The present policy of *laissez-faire* for which the Government and the people are alike responsible, leaves everything to chance and individual effort—two most excellent factors in their way but in their resultant effect not always conducive to the best results. A giant of the Tata type who possesses all the highest qualities of philanthropist, business man, leader of men, *entrepreneur*, is a rare phenomenon. Philanthropists of the class who have flocked round the "Swadeshi" standard, although enthusiastic champions of the cause, often operate in the mists of speculation and conjecture and, armed with unassimilated facts and statistics, strive for light without a match and for a match without wood.

¶¶¶ After these come a host of speculators and adventurers, a mere fraction of whom are really sound or capable of taking an active part in engineering a business with advantage to themselves and to the public at large. The majority are profit-seeking but not risk-taking, and cultivate the art of acquiring something when they possess nothing. If a census were taken of the small industries, such as soda and ice factories, brick and tile

manufacture, oil and *surkhi* mills, printing and cotton presses, which have appeared and vanished in India in the last twenty years, it would reveal an appalling record of fraud, failure and ruin. It would illustrate why, in the industrial world, capital remains shy, effort lies crushed, and talent wanders unemployed.

What we need most in this province is a strong organisation for the promotion of industries based on co-operative principles, supported and guided by Government, assisted by the Registrar of Co-operative Societies, and presided over by the Director of Industries. Schemes thought and worked out by such an influential body would at once attract capital, and the great financiers of Bombay and Bengal and distinguished business firms like Messrs. Martin and Company of Calcutta and Messrs. Killick, Nixon and Company of Bombay who have contributed so largely to the advancement of the industrial cause of India, would readily come forward to place the development of the province on a sound footing and provide the dynamic impulse for its ultimate triumph. The proposed organisation should confine its activities, for the present at any rate, to promotion only. The time will no doubt come, perhaps at no very distant date, when it may extend its sphere of action and begin to branch off into separate co-operative societies or to help in the formation of local private syndicates for the promotion as well as the actual working of provincial industries without any outside help.

Financial Aid.

Qs. 1 to 8 and 13. — There are hardly any large capitalists in this province. The very few there are have their hands full with their own affairs and have neither the time nor the inclination to attend to other objects. Since my retirement last year I have been approached by several would-be promoters for help and advice and some of the projects placed before me were of a very promising character. In nearly every case the requisite capital was not forthcoming for the preliminary investigations. In one instance where the difficulty of capital fortunately did not arise, the project was buried out of sight because co-operation with other people capable of bringing it to a successful issue was highly distasteful to the party. There is abundance of capital outside the province which, I have been assured by men of the highest position in industrial circles, would be ready to flow in if carefully worked out schemes of a profitable nature could be definitely laid before them. Capital.

It is significant that the only feeder railway in the province, the Central Provinces Railways Company, owes its existence to outside influence. That influence has, however, not been persistent enough in the same way, for instance, as in Bengal where Messrs. Martin and Co., Gillanders, Arbuthnot and Co. and McLeod and Co., of Calcutta are steadily multiplying such railways. Time was when Government promissory notes constituted the only form of investment for the middle classes. Railway enterprise has been rapidly winning the confidence of the public and railway shares have come to be regarded as gilt-edged securities, sometimes even without any guarantee of interest on capital from Government or District Board (*e. g.*, Shahdra-Saharanpur and Dehri-Rohtas). The salvation of this province lies in its own hands; the people must learn the value of thrift and self-reliance, and Government must help and guide the people in working together on co-operative principles. The aggregate working capital of the co-operative banks in the Central Provinces and Berar stands this day, I believe, somewhere in the neighbourhood of 45 lakhs. One object lesson such as this should suffice to fill our minds with hope and faith in the future.

To begin with, Government must take upon itself the task of establishing a co-operative organisation for the promotion of industries in the manner indicated above. Once a machinery of this description is properly set in motion, the evolution of projects falling under the heads of the following classification would become a matter of time and systematic effort :— Government assistance.

Class A.—Remunerative projects which private capitalists or syndicates would take up readily.

Class B.—Projects which would have a reasonable prospect of proving commercially practicable.

Class C.—Projects the commercial practicability of which would be somewhat uncertain but not altogether so.

Class D.—Projects which would prove to be commercially impracticable.

There would be no lack of capital for the class A industries and Government assistance would follow the lines adopted for railway enterprise. The public has become familiar with the operation of the system of guarantee given by Government for railways and by District Boards and Municipalities for railways and electricity schemes. Nothing beyond this would be necessary to ensure success in the case of this class of projects. Class D projects would of course be shelved, at any rate for the present.

Pioneer factories.

Projects under classes B and C would come under this category. I have no experience of Government pioneer factories but am inclined to think that these should, as far as practicable, be run on strictly commercial lines. I would invite private capitalists or companies to work these industries, certainly those of class B, by giving a guarantee of dividends higher than in the case of class A, coupled if necessary with the supply of machinery and plant on the hire purchase system and the promise of Government purchase of products for a limited period, in the event of a still further concession being deemed expedient. Endeavour should, in the first instance, be made to deal with class C on the same basis, offering if necessary even more favourable concessions than in the case of class B. Failing this, Government must pioneer industries of class C utilizing jail labour and expert departmental agency (*e. g.*, Forest and Agriculture) for the purpose where practicable. In the event of these pioneer industries proving successful no time should be lost in placing them in the hands of private companies for further development. The field for industrial operation is so great and the number of private enterprises is so small that, in this province at any rate, Government assistance need not bind itself to any limits. Private capital and private effort have been exceedingly shy in their appearance and a certain amount of preliminary courtship will be necessary before they can be brought forward to the open-air life of industrial activity.

*Co-operative organisation.***Composition.**

Qs. 10 to 12, 56 to 62, 97, 99 and 102.—We may now proceed to look somewhat more closely into the scheme of co-operative organisation the vital importance of which, in the present industrial state of the province, I have ventured to urge in the foregoing paragraphs. It is conceivable that when the principles underlying the scheme are fully understood private syndicates formed on co-operative lines or otherwise might come forward to take the field in the right way and spirit. But there has been a long enough pause in this direction and the time has, I think, arrived for co-operative movement by the united efforts of Government and the people. We must proceed slowly, with due caution and deliberation, and without going to the opposite extreme of running at railway speed. The control of this organisation should be vested in a Board or Syndicate composed as follows:—

PRESIDENT—Director of Industries.

VICE-PRESIDENT—Registrar, Co-operative Societies, who will preside in the absence of the President.

MANAGING DIRECTOR OR SECRETARY—An experienced man (preferably non-official) who would have the confidence of Government and the public.

MEMBERS—1. Commissioner of the Jubbulpore Division.

2. Chief Engineer, Buildings and Roads (who deals with railway and electricity matters).

3. One of the recognised leaders of the province (*e. g.*, Sir Gangadhar Chitnavis and Sir B. K. Bose).

4, 5. Two leading business men of the province (*e. g.*, Sir Kasturchand Daga and Sir Bezoni Dadabhoy).

6, 7, 8, 9. Four prominent members of the co-operative society (in addition to 3, 4, 5).

10, 11, 12. Representatives of outside business firms (*e. g.*, Messrs. Martin and Company of Calcutta and Messrs. Sassoon David and Company and Messrs. Killick, Nixon and Company of Bombay).

Functions.

The principal task in front of the Board will be the promotion of industrial schemes; towards the fulfilment of that object the presence on the directorate of financiers and business men of high repute is essentially necessary. The time is opportune for investigation and promotion; the activities of the Industrial Commission have brought into prominence the urgent needs and almost unlimited resources of the province; and the War has caused a lull which can be turned to advantage in prospecting, collecting statistics, working out approximate estimates of outlay and profit, getting up cut-and-dried projects, and holding ourselves in readiness to begin work immediately normal conditions are re-established. At the same time the Board can employ itself in disseminating knowledge, awakening the people to a sense of responsibility in regard to their economic advancement, educating them in the methods of promotion and the advantages of prudent investment, and preparing the public generally for the laying out of capital when the time comes for floating industrial enterprises.

The development of industries is seriously handicapped by the inadequacy of communications and the almost entire absence of railway feeders. Much has been done towards road construction but a vast deal more yet remains unaccomplished. Energetic steps must be taken for the improvement of road surface and river crossings to ensure the uninterrupted passage of traffic throughout the year and facilitate the establishment of transport services of the most modern types (*e. g.*, motor lorries and buses). Even measures such as the imposition of a special cess or the falling back upon the primitive if not pernicious system of levying tolls, however distasteful in their operation, must not be shrunk from if proved inevitable for the salvation of the province. In the front rank of schemes to be promoted must be placed feeder railways and electricity supplies. The one railway feeder can with the utmost advantage be increased a hundred-fold and in place of the one electric installation we can easily afford to have twenty. Projects of this type are invaluable, for their advancement from inception to fruition lies in the hands of Government and its subordinate District and Municipal Boards. The surplus capital of the wealthy, the hoardings of the poor and the savings of the middle classes are being steadily drained away to the neighbouring provinces for the fulfilment of such objects, and an earnest and determined effort must be made to arrest this outward flow and divert it towards our own enrichment.

Roads and railways.

Other schemes for promotion will soon begin to unfold themselves. The mining enterprise which has already achieved so much has before it a very large field of activity. The Gondwana clays which have been raised by handfuls may be extracted in tons. The existence of materials for glassware has been proved. The pressing of oil in the great cotton and oil-seed bearing areas is likely to prove profitable. The rich sugar-cane tracts will afford an excellent opening for sugar industry. The immense *hurrai* forests, the thriving trades in hides and skins, the extensive speculation in lac, etc., offer promising fields of research in the direction of dyeing, tanning, manufacture of tannin and leather, etc. The desultory inquiry into hydro-electric schemes has so far merely led to the discovery of sources of power beyond the range of industrial centres. A simultaneous and carefully organised effort towards the development of power and the growth of industries within driving distance would be productive of valuable results.

Other schemes.

The capital required for promotion will not be very large and in due course it may perhaps contrive to live and grow on its own earnings. This capital is not, as in the case of agricultural co-operative societies, to be issued in granting loans to others but for consumption in the search after profitable schemes. No highly organised machinery is, therefore, necessary to raise capital for this object. The simplest course would be to arrange for the co-operative movement being financed by the provincial co-operative bank or by an industrial bank, preferably the former in order to promote cohesion between the existing and the new co-operative organisation. Sir Benjamin Robertson has in a recent pronouncement called attention to the fact that half of the provincial bank's capital is invested outside the province, and to the coming time when there should be a wide field for the local investment of resources. The new movement would signify a partial fulfilment of his anticipation. If banking facilities must be sought elsewhere, an industrial bank might be brought into existence for such purposes as an offshoot of one of the presidency banks (Bank of Bengal or of Bombay) but not of any private bank. There are several private banks whose stability is beyond question, but the co-operative societies are not free from elements of uncertainty and it would be highly inexpedient to add to these by any further risk which might possibly arise from the failure of a private bank, however unlooked for.

Financing agency.

The recurrent charges will consist of the salary of an office staff and interest on the capital laid out. I am not a great believer in absolutely honorary work and it seems to me that the need will be felt for a paid managing director or secretary. Some public spirited person possessing the requisite qualifications might perhaps offer his services on a comparatively small remuneration: otherwise a good business man on a substantial salary must be appointed. Then there will be the outlay on investigation, collection of data and statistics, reconnaissance surveys, prospecting new areas, expert advice and research, and travelling and other miscellaneous expenses inseparable from such an undertaking. Above everything else, thoroughness must be constantly aimed at. With the help of departmental records and the active support and assistance of the heads of departments and district officers, it should be possible to keep the outlay within very reasonable bounds. The annual expenditure will depend on the number and nature of schemes taken up; of this no forecast of value is possible at present. The expenditure will, of course, grow from year to year, but it will probably not go beyond half a lakh per annum during the first three years.

Outlay.

I have no means of knowing what private promoters or established business firms make out of the "promotion" charges. I am told that in the flotation of a flourishing industry of recent date a private syndicate recovered three times the actual cost of promotion. Among the projects placed before me for professional scrutiny, I noticed that one

Earnings.

would-be syndicate estimated a return of Rs. 100 per cent. and an aspiring promoter with certain crude data for a scheme of apparently high promise calculated upon clearing six times his outlay. One can form some idea of the promotion and floating expenses of a railway company from the clear and concise prospectus which it ordinarily issues for taking the public into its confidence. A typical feeder railway on the 2'-6" gauge, 25 miles long, costing say 10 lakhs, would probably bear something like the following charges debitable to capital outlay :—

Preliminary expenses	...	...	...	7,000
Surveys	...	...	...	15,000
Raising of capital, commissions, brokerages, and other incidental expenses.				50,000
Advertisements, printing, legal and registration charges etc.				3,000
				<u>75,000</u>

It would appear that 7 to 8 per cent. of the capital outlay is usually absorbed by the promotion and floatation charges. If the co-operative movement proceeds methodically with the requisite energy, perseverance and intelligence, I do not see why it should not earn at least one per cent. out of the capital raised in this manner. If 40 to 50 schemes could be successfully launched in the course of five years—which is not an over-sanguine estimate, considering that they would probably include some thirty railway and electricity projects—the percentage earned on an aggregate capital of 500 lakhs would probably bring in 5 lakhs equivalent to an average return of one lakh per annum.

Profit and loss.

Of the four classes of projects indicated above the promotion of classes A, B and C would be of a remunerative character. That is to say, the Board would charge promotion money in each case, which would cover actual expenses *plus* a fair margin of profit, and go against the capital cost of the undertaking. Class D would thus be the only source of loss. Of the extent of loss likely to be sustained in this way no idea can be formed until some advance is made in actual operations. The profit and loss account will adjust itself satisfactorily in a series of years, as soon as success begins to over-balance failure, through skilful management. Government must be prepared to face the contingency, however remote, in which a partial deficit may have to be recouped in spite of all suitable precautions. It may be reasonably hoped that with due exercise of fore-thought, prudence and economy, the co-operative movement will become self-supporting and a source of profit to itself as well as to the industrial public at large.

Conclusion.

The predominant task before us is the vigorous advancement of industrial progress. For the accomplishment of that task, a powerful agency is needed for investigation and promotion. In a hurried memorandum like this all that can be attempted is a very rough outline of the organisation requisite for the purpose; its form, functions, fields of operation and financial prospects. The precise determination of these essential particulars must rest with Government guided by the recommendations of the Industrial Commission. The co-operative organisation herein urged is designed to take the place of spasmodic efforts of individuals which have proved ineffective and inadequate with the result that this province is at the present moment a mere looker-on while its neighbours are climbing resolutely, step by step, upon the great ladder of industry. It is to be the vital nerve-centre from which industrial activity will flow and radiate in every direction. And the wave of prosperity that must set in in response to the united impulse of Government and the people cannot fail to satisfy the aims and aspirations of the province in the fullest measure.

Oral Evidence, 2nd December 1916.

President.—Q. I have only one point on which I should like to ask you and that is with reference to what you say in the concluding paragraph which is not very clear as it is worded now. You say 'the co-operative organisation herein urged is designed to take the place of spasmodic efforts of individuals which have proved ineffective and inadequate with the result that this province is at the present moment a mere looker-on while its neighbours are climbing resolutely step by step upon the great ladder of industry.' In what way has this province been differently placed to the neighbouring provinces? Have they had any special organisation or assistance which this province has not had?—A. I do not refer to matters of assistance. They had more private capital and business capacity. There has been no organised effort in this province.

Q. Do you think that this will not occur if Government had the initiative?—*A.* I think Government help is very necessary. The mere fact that we have not advanced so far shows that something is wanting and that Government assistance is necessary.

Q. Before anything like a serious development takes place you consider that it is necessary to have a big organisation such as you have sketched out here with the Director of Industries as Chairman. Who is to provide the capital for this?—*A.* I have indicated how the capital is to be derived. First of all the Directors can do something. Take the example of the Central Provinces Co-operative Bank. Every director has to purchase shares to the extent of Rs. 5,000. If you have 12 directors that would bring in Rs. 60,000 and then a minimum subscription of Rs. 10 might be laid down for members.

Q. That would be a sort of development company which would branch off into subsidiary companies later on?—*A.* Not immediately. That will come some time afterwards.

Q. Would you allow any industries to be developed without regard to its parent company?—*A.* Any schemes that may be formed will have to be placed before the Board. We should not court failure and dupe the people. Certain industries have been started in way and that has led to failure.

C. E. Low, Q.—You speak of industrial surveys. Do you consider an industrial survey made by non-expert agency of any use?—*A.* There are so many departments of industry that you cannot have an expert for every department of industry. I think an intelligent man who knows the province can easily make a survey of the province on the lines indicated and a haphazard see what the province is capable of doing.

Q. The possible sources would lie in minerals and agricultural products and forests and there are the Geological, the Agricultural and the Forest departments. Would they not be more suitable agencies than these non-experts?—*A.* There must be some authority who would co-ordinate the activities of these departments and at the same time extend their enquiries in all possible directions. There should be a central authority for doing this. He ought to be a man who would bring all the facts and experience together and place it before the public.

Q. He would not do anything himself?—*A.* He would not be a mere compiler and in doing his work he would bring his own experience to bear upon the subject.

Q. Have you hitherto seen any practical result from an industrial survey?—*A.* I do not know if there has been a regular industrial survey so far and no effort has been made to take advantage of the survey.

Q. Under the scheme which you contemplate would they get their own experts or would the Government place its experts at its disposal?—*A.* If we cannot get expert advice ourselves we shall have to get it from outside and that will have to be paid for.

Q. Does your scheme arise from the fact that the Government have done nothing or is it due to the fact that your scheme would be better than having a Government department with experts to do the thing?—*A.* I do not say that the Government has not done anything. What I say is that the people must also do something in that direction.

Q. You would like to bring in the people?—*A.* Most certainly.

Q. With reference to what you say about the co-operative organisation are you a considerable investor?—*A.* Yes.

Q. Is the confidence of the people due to the fact that Government has got an expert controlling agency?—*A.* Not merely that. I think there is the feeling that the organisation will not be allowed to fall to pieces for want of proper control. That is because Government is at the back of the thing, not as a responsible agent but as a controlling agent.

Q. There is the belief that the control will be effective?—*A.* Yes.

Q. Do you think it would help if Government undertook the research portion of any enterprise?—*A.* There is no objection to Government taking up research work, provided the results of the work are placed before the Board.

Q. Do Indians invest in light railways?—*A.* Very largely. I could easily name half a dozen who have put in a couple of lakhs.

Q. In the Central Provinces rails?—*A.* Outside.

Diwan Bahadur
Seth Ballabhdas.

Q. They don't invest much in Central Provinces?—A. I have not got the prospectus. I suppose not.

Q. Do you think that local manufacturers would have a better chance of supplying stores if you had a department of stores in India under the Government of India?—A. I don't think so. I think we ought to proceed on perfectly commercial lines. I do not think personally the stores department of the India Office has been a success.

Q. Do you think it has been a success from the English point of view?—A. Rather on but not from the Indian point of view. I would have fairplay throughout.

Mr. A. Chatterton.—Q. Would you not like to have a Director of Industries in addition to a Director of Agriculture?—A. I think it would be rather an advantage to have both industries and agriculture together, because I am proceeding on the suggestion that it should be a co-operative organisation.

Q. Is there not sufficient work for the whole-time Director of Industries?—A. I think it would be much better if the work of the two departments were co-ordinated. I don't think there is sufficient work for a whole-time Director. We ought to proceed very slowly. Separation may be necessary later on but at present I would have the Director of Industries and Agriculture in one. We ought to make a slow start at first. If it is found necessary to have two, we can do that later on.

WITNESS NO. 163.

*Diwan Bahadur Seth Ballabhdas, Banker and Landholder, Proprietor of the
Jubbulpore Glass Factory, Jubbulpore.*

Written Evidence.

Capital.

My experience of the raising of capital for industrial purposes is confined to the Central Provinces, where, in addition to other works, I started in the year 1882 the Gokaldas Ballabhdas Cotton Spinning and Weaving Mills. Later on, in the year 1905, I started the Perfect Pottery Co., Ltd. Both of these are limited liability concerns. In the year 1908 I started the Jubbulpore Glass Factory, and in 1910 projected a hydro-electric scheme to utilize the Gour river. At present both of these are my private concerns, my intention being to turn them into limited companies only after a fair prospects of their being successful.

In spite of my position and influence as a landholder and banker on this side, I had considerable difficulties in subscribing the necessary capital for the mills and pottery works, and the only way in which these concerns could be started was to take the bulk of shares myself. In my opinion the following are some of the reasons why I could not raise the necessary capital, and why difficulties are experienced in general in the raising of capital for industrial purposes:—

- (a) India is purely an agricultural country. In spite of demonstration farms and Government assistance, cultivators continue to follow in the footsteps of their ancestors, and resort to primitive modes of cultivation, without the assistance of labour-saving implements. The science of fertilization is not understood, and hence the productive power of land is being reduced year by year. In the absence of regular canals and water-supplies, crops are mainly dependent on the monsoon. All these causes combine to make agriculture dear, and profits from agriculture are not so large as they are generally supposed to be. This is supported by so few well-to-do cultivators attaining to the status of malguzars. Agriculture being dear, profits are necessarily low, there is not much saving, and hence very little surplus capital is available for industrial purposes.
- (b) The Indian capitalist expects a quick return on his outlay, and is therefore induced to invest his surplus cash in landed estates, rather than in industrial undertakings, where realizations of profits are late and doubtful owing to the following causes:—
 - (1) *Want of skilled labour.*—When I started the Gokaldas Ballabhdas Spinning and Weaving Co., Ltd., I had considerable difficulties in finding suitable labour, and had to send men to Bombay to be trained at the place. The profits of land being reduced as stated above, labour prefers emigration. What labour is available is unskilled, and is to be trained at a great cost and consequent reduction of profits.

- (2) *Want of proper experts, and the very great difficulty in inducing really good experts to come out to India.*—Prospects were not bright at the Perfect Pottery Works for some years till the arrival of a manager from America. Since the starting of the Jubbulpore Glass Factory, I am doing my best to get really good experts, but have been unable to secure the services of good smelters or blowers. Considering that Germany and Austria were the centres of glass trades, as was then imported to this side, I called out, at very heavy expense, German and Austrian workmen from Europe. These workmen did not give the least satisfaction. Up-to-date I have spent about Rs. 5,00,000, which amount, in spite of best results in future, I do not expect to realize back. In spite of this very heavy sacrifice, I have no expert to attend to smelting and blowing departments of the glass factory.
- (c) The very low standard of business morality of those concerned in some of the recent failures in presidency towns (the most notorious being the Indian Specie Bank affair) has acted as check on investment of capital for industrial enterprises. I have lost a sum of Rs. 2,00,000 in the Specie Bank in my zeal to encourage Indian efforts, and this sad experience is likely to prevent many more victims to lay out their capital for industrial concerns.
- (d) The present system of education does not inculcate a taste for industrial enterprises.
- (e) The duty on Indian cotton mills' products has given a false idea to the capitalists in India that the Government is against the encouragement of Indian industries, and will always favour a protective system in favour of home industries.

For removing the difficulties set forth by me as above, I suggest :—

- (1) That agriculture should be made as cheap and productive as possible. The scope of demonstration farms should be expanded. The average cultivator has no knowledge of the means by which his land could be improved, and therefore he should be taught the advantages of manuring his land and of labour-saving implements. Experts should be appointed to study the cheapest mode of fertilizing different areas of country, and the results of their inquiries should be made known broadcast in the language of the people. Arrangements should be made to supply a steady water-supply for cultivation, as far as possible.
- (2) If agriculture is made lucrative, labour will not migrate and a class of capitalists will be created, and under the fertilizing effect of capital, labour will thrive and will become productive. To train labour, arrangements should be made to get out good experts. In my opinion the present system of getting out experts is not satisfactory. The expert must be up to his work, his remuneration should be substantial, and the period of his engagement should be a long one. Without good remuneration a really good man will not be induced to come out to India, and his services are not likely to be productive unless his stay on this side is a long one. On his arrival here, he has to study the resources available, and if his services are not engaged for a long time, he will be just leaving at the time when he has secured sufficient experience. In my opinion this engagement should be for at least seven years.
- (3) I am not in favour of any form of Government control over industrial concerns but, in my opinion, the duties, responsibilities, and powers of certified Government auditors should be increased, to enable them to detect irregularities and frauds.
- (4) As the system of education now stands, an average Indian student thinks a lucrative Government post, or a legal degree, as his goal. Owing to this there is a cramming up of youths educated on a particular line, who are quite unfit for business and industrial purposes, and there is more than enough of lawyers. Owing to there being more lawyers than needed, we see much litigation which ultimately results in making many of the litigants penniless. The system of education should be remodelled and a taste for business, industries, and agriculture should be inculcated.
- (5) The first opportunity should be taken by the Government to repeal the duty on Indian cotton mill products, and the deficiency should be made up by increasing duty on non-British importations. The Government should declare a definite policy for the maintenance of existing and for the starting of new industries.

Government assist-
ance.

As regards the methods of giving Government aid to existing or new industries, I am of opinion that any of the suggestions made under question No. 5 would be suitable, but perhaps different industries would require different treatment.

General official
administration and
organisation.

I am of opinion that there should be a Director-General of Industries for the whole of India, and that the Directors of Industries of the several presidencies and provinces should be under the Director-General. An Advisory Board should be established to assist the various Directors. This Board should be composed of members selected for their business and industrial capacities. If necessary, these members should be paid men.

A Director of Industries may be a business man, but a Director-General should certainly be an administrative officer.

As to the Government organisation for the collection and distribution of commercial intelligence, in my opinion, for years to come, these journals will be of no practicable utility to the masses, unless they are translated and promulgated in the language of the people.

I have projected a hydro-electric power scheme for the utilization of the Gour river near Jubbulpore. Up to now I have spent about Rs. 40,000, as preliminary expenditure, but nothing definite has resulted owing to the diversity of the opinions of the experts. I am anxious of putting the papers before the Administration, and to ask their assistance in the matter.

NOTE.—*Witness did not give oral evidence.*

CALCUTTA.

WITNESS NO. 164.

RAI J. M. MITRA BAHADUR, M.A., *Registrar of Co-operative Societies, Bengal.*

WRITTEN EVIDENCE.

Q. 1—3.—I have had no experience of the raising of capital for industrial enterprises but Capital. I have considerable experience in raising capital for the co-operative movement. At first people did not trust the movement and we experienced the greatest difficulty in getting funds. On the first occasion on which I raised money in Calcutta from the public I had to pay as much as 12½ per cent. but even then money did not come in very freely. Gradually as the working of the co-operative societies came to be known money began to come in freely. At present we do not find any difficulty in getting money at 6 to 7 per cent. and, in fact, we get more money than we can profitably employ.

Another reason why we do not find much difficulty in getting capital for the movement is that in the districts we have always been successful in associating the leading people—men who have the confidence of the public—with the movement. I am of opinion that so far as Bengal is concerned, although the extent of hoarded capital has been greatly exaggerated, a large amount of capital is available which may be attracted to industrial undertakings. The co-operative movement is likely to play an important part in this direction. A development of banking habits among the people will form one of the best means of encouraging investments in industrial enterprises. The circumstances of the country do not, however, permit of a large extension of joint stock banking in the interior, especially in the near future, and the only banking system which is capable of indefinite expansion is co-operative banking. Co-operative banks have in many places been successful in attracting hoarded wealth and in developing a habit on the part of the people of investing their savings. Secondly, co-operation by encouraging thrift will give a powerful impetus to the creation of capital. Thirdly, by reducing the general rate of interest and by putting a stop to usury it will encourage investments in industrial concerns. Fourthly, co-operation, by reducing the heavy load of indebtedness of the agriculturists, will set free a large portion which is now employed on agriculture and which is now earning a rate of interest which industrial concerns can hardly afford to pay, and will thus directly promote and encourage investment of Indian capital in industries. XX

The principal sources from which capital for industries may be drawn are the savings of middle classes and the savings of substantial agriculturists. In my opinion whenever a new industry is started in any locality an attempt should always be made to get the people of the place to subscribe the necessary capital.

Qs. 5 and 6.—Supply of machinery and plant on the hire-purchase system to industries Government which have been co-operatively organised and to small concerns which agree to put themselves assistance. under the guidance of the Director of Industries will be an excellent method of assistance.

I think whenever there is Government assistance there should be some Government control. It seems to me difficult to express an opinion as to the form of this control; but I doubt very much whether the appointment of Government Directors will be productive of much good. The control should, as far as possible, be legal in form. I do not think that any appreciable progress will be made in industrialism in this country till people learn associated action and I would therefore urge the necessity of taking proper steps to develop joint stock enterprises. My suggestion is that a more elastic Act than the Indian Companies Act should be framed to encourage the formation of joint stock enterprises and also to provide for an adequate Government control over such concerns. The Director of Industries should be empowered to register joint stock concerns under the Act. The Act should not be open to big concerns, and the Director of Industries should be given a free hand to register a concern or not. If the Director thinks that the concern is not one which should be registered under the special Act, it will be open to the promoters to have it registered under the Indian Companies Act. The Director should be given special supervisory powers over concerns registered under the Act. It should, however, be made clear that registration under the special Act is no guarantee of success, solvency and good management, but it will afford proper safeguards against abuses and fraud. The Indian Companies Act is based on the English Act but the present English Act was framed as a result of the experience of the development of joint stock enterprise in the country and did not precede such development as in India.

Qs. 9 and 10.—I doubt very much whether there will be sufficient scope for industrial banks Financing agencies. just at present and I think, to begin with, direct Government loans or loans through Presidency Banks should be encouraged. Later on when there are sufficient industries to finance it may be possible to have a separate bank for financing industries.

Qs. 11 and 12.—Societies amongst weavers have been formed to assist the weaving industry Co-operative socie- and two societies have also been organised in the district of Birbhum for assisting the local ties. shoe-makers' industry. The means adopted are :

- (1) Supply of raw material at wholesale rates,

- (2) Advances at moderate rates of interest to free them from indebtedness to their money lenders and for maintenance during the period of production and also advances against finished products.

- (3) Arrangements for the sale of finished products in better markets.

There is scope for co-operative societies with regard to the following cottage industries :

Silk reeling.—There is a promising field of work amongst the reelers of Malda and Jangipur for the purchase of improved reeling apparatus and for the joint sale of the silk spun by the members.

Brass and bell-metal.—Societies may be formed for the introduction of labour-saving appliances, such as improved lathe, hydraulic press, etc.

Pottery.—Societies may be attempted amongst potters for the production of better class of articles, such as enamelled tiles, tea cups. An enterprising person in Dacca has succeeded in putting enamel upon ordinary earthen pots, but the industry is still in an experimental stage. Expert advice and scientific appliances are necessary to make the experiment a success.

Mother-of-pearl buttons.—This is a new industry, about 10 years old. The principal seat of the industry is at Dacca. There are about 200 workers who make these articles in addition to carrying on their vocations. Societies may be attempted amongst these men for the purpose of getting better classes of shells and also for the introduction of labour-saving machinery and joint sale of the articles manufactured. Here also expert and scientific advice is necessary for improving the finish of the articles manufactured. There is a continuous demand for the articles. The country-made things are successfully competing with foreign articles. Attempts may be made to extend this industry in other districts.

Carpet-weaving and blanket-making.—These industries can be organised co-operatively.

Conch shell industry.—This industry is organised on a factory basis. Different workmen work at different stages. Societies may be formed by taking in all classes of workmen ; but considering the present condition of the conch shell market, it is not advisable to try to organise any society amongst the conch shell workers. About 10 lakhs of shells are annually imported from Madras. The Madras Government has a monopoly of these shells. Formerly Government used to sell the shells by auction. A Dacca man has, by offering a high price, now entered into a contract with the Madras Government for the monopoly of shells. He is said to have purchased the shells at the rate of Rs. 12 per 100, and is now selling them at about Rs. 60 to Rs. 65 per 100, whereas formerly they were sold at Dacca at rates varying from Rs. 15 to Rs. 28 per 100. I think the Bengal Government ought to enter into some arrangements with the Madras Government by which the shells may be sold to these people at a reasonable rate. I understand several conch shell workers have been thrown out of employment.

Shoe-making.—Two such societies have already been organised for purchasing raw materials at wholesale rates and for retailing them to the members. Similar societies may be attempted in other suitable centres.

The industry of the blacksmiths.—Attempts may be made to organise societies at suitable centres amongst blacksmiths for manufacturing agricultural implements of improved kind at a cheaper price. Improved tools and improved designs may be introduced amongst these men through the medium of co-operative societies.

Carpentry.—There is scope for co-operative societies for carpenters for the supply of wood and for the sale of finished products.

Mat-making.—This is another industry. There is always a large demand for mats. The workers are wholly in the hands of local dealers.

My own opinion is that adequate steps should be taken for the development of the cottage industries in India. Cottage industries at present play an important part in the economic life of India. I believe, if they are properly organised, cottage industries will still survive the stress of factory competition. Skilled artisanship which is connected with cottage industries is necessary to the development of intellectual and aesthetic life in India. The existence of cottage industries has a moral value to the community as a whole. The cottage workers are more useful members of the community than mill hands and the country as a whole will be loser if they are allowed to sink to the level of a city proletariat. In developing industrialism in India we should try to avoid the worst aspects of modern industrialism in Europe.

With regard to the majority of cottage industries, combination and co-operation may solve many of the existing difficulties. At present the industries experience difficulties with regard to the supply of raw material and the sale of finished products. Cottage industries have to buy their finance dear and sell their products cheap. The industries are wholly in the hands of middle men who supply them raw material very often at exorbitant rates and take over the finished products at a price which leaves the industries very little margin of profit and which reduces the workers to starvation wages. Co-operation will not only enable cottage industries to get a supply of raw material at wholesale rates but will enable them to dispose of finished products at an advantage. It will also enable them to obtain improved machinery which is beyond the means of individual workers.

I would like to mention here that there is also scope for the improvement of hand-loom weaving by the establishment of small factories under the control of, or owned by, "master

weavers" by which term is meant men of some education with a practical knowledge of the modern developments in hand-loom weaving. But in order to improve the general condition of the weavers by means of establishment of such factories, care should be taken to organise them on a profit-sharing basis.

Q. 13.—The principle of *laissez faire* is no doubt theoretically the best principle that a Government ought to follow in regard to economic and industrial activities. But in India where State socialism prevails in many spheres of economic activity, the policy of paternalism is not objectionable, provided always that it is adopted in cases where the people, through lack of knowledge or want of proper initiative and guidance, cannot take full advantage of the situation. The function of the State in India in industrial sphere should be to help the people to help themselves, nothing more or less than that. If in the case of any industry the people cannot be trusted to help themselves the State should not step in. If, on the contrary, the State helps an industry to come into existence, it does not discourage private enterprise but rather encourages it by showing the right lines of advance and helping the enterprising to help themselves.

Q. 14.—I should not think that there should be any limitation; it should be the effort of every country to be as economically self-contained as possible.

Q. 25.—Before any cottage industry is co-operatively organised a proper survey should be made of the conditions of the industry, particularly as to how such industries obtain their raw material and how they dispose of their finished products and how labourers are financed and whether any improvement in appliances is possible.

Q. 30.—I think it is very necessary that sales agencies or commercial emporia for the sale of unorganised cottage industries should be established. With regard to societies among cottage workers the greatest difficulty is now experienced in marketing the finished products. At the initial stage it is necessary for Government to arrange for funds to start a dépôt in Calcutta for the sale of finished products. In time it will be possible for the societies to take over the cost.

Q. 41.—The opinion is held by many that the slowness of industrial development in Bengal is due to the permanent settlement which encourages investments in land in preference to investments in industrial enterprises.

Q. 43.—Under the Land Acquisition Act land may be acquired for a company, but it is necessary for a company to prove that the acquisition is needed for the construction of some work and that such work is likely to prove useful to the public. It is extremely difficult to prove that any work in connection with a particular industry will be useful to the public. Government should be given a free hand to acquire land required for a company. All applications for land should be submitted through the Director, and land should be selected by him in consultation with the district officers so that such acquisition may not entail hardship on individual persons.

Q. 45.—The best way of improving the labourer's efficiency and skill will be to introduce primary education amongst artisans. An attempt should be made to bring the instruction into touch with their occupations. In the case of several industries the efficiency of labourers will be considerably improved if a substantial improvement can be effected in the condition under which labour is recruited.

Q. 50.—I think industrial schools should be under the Department of Industries but the Director of Industries should consult the Department of Education on educational curricula. I may point out that some sort of combination of general education with manual instruction is necessary to create amongst the people a mechanical and industrial aptitude. Any scheme for giving technical education to the people, particularly to the lower bhadralog class, which does not take into account their hereditary craving for general education, is doomed to failure.

Q. 56—62.—As regards the development of official administration, my opinion is that there should be a large Imperial Department in charge of a Director General of Industries. He should have special scientific departments for research and should be assisted by a body of experts. The research scholars should be engaged in suggesting economy in material and labour. There should be a central school of design for preparing and circulating design books for workmen. In each province there should be a Director of Industries not necessarily an expert, but an officer with administrative experience. He should be a sort of intermediary between the Imperial Department and the local industries. He should bring all improvements which the Imperial Department recommends to the notice of local industries. He should advise the central department whether with regard to any local industries there is scope for research. His advice and assistance should be placed freely at the disposal of all the industries in the Province. He should arrange for technical advice and assistance to local industries in consultation with the Imperial Department. He should make investigations as to the suitability of any industry to any particular area and should advise the people about the steps to be taken to develop the industry. He should try to develop joint stock enterprises very much in the same way as the Registrar of Co-operative Societies tries to promote the development of co-operative societies. To begin with, it may not be necessary to place experts under him. He will have the experts of the Imperial Department to assist him. Later on when there has been some development I anticipate that it will be necessary to place whole-time experts under him.

I would recommend the appointment of an Advisory Board consisting of officials and non-officials. The Director of Industries should be directly under the Provincial Government and the Member of Government in charge of Commerce should preside at meetings of the Board of Industries.

Colleges of commerce.

Qs. 80-81.—I would like to see colleges of commerce established or preferably commercial universities which will combine general education with theoretical and practical training in special industries. This will satisfy the passionate yearning of the people for university degrees and will enable students to specialise in special industries.

General.

Q. 112.—In the case of conch shell industry the supply of raw material is retarded by preventable causes (*vide* answer to questions 11 and 12).

ORAL EVIDENCE, 3RD JANUARY 1917.

President.—Q. May I understand from your answers to questions 5 and 6 that you want some Companies Act introduced, that will not be like the present Indian Companies Act, to deal with smaller concerns?—A. Yes.

Q. In what respects would it differ fundamentally from the present Companies Act?—A. Under the existing Companies Act, any person can float a company and can get any company registered if he draws up the articles of association in conformity with the provisions of the Act. That company may be a bogus company, but he can get it registered.

Q. He has got to supply information about it in the prospectus?—A. Yes. If it complies with the requirements of the law it can be registered. I want an Act which will give the Registrar whoever he may be, (I have suggested that the Director of Industries should be the Registrar), power to refuse registration or not.

Q. That is to say, the Director of Industries will have to look into the prospectus of the company, in other words, he will have to see whether it is a sound investment or not?—A. Whether there is a reasonable chance of success or not.

Q. The difficulty is that you throw an enormous amount of responsibility upon the Director of Industries?—A. Not exactly. Just like the Registrar of Co-operative Societies he can refuse registration, if he has any doubts about it. It won't interfere with private enterprise because the promoters can fall back upon the Indian Companies Act. Still if the people in the districts know that there is a separate Act and a company registered under that Act will be, to a certain extent, under Government supervision, they will be careful to enquire why any company has not been registered under the special Act.

Q. It seems to me that you are suggesting a proposal that is difficult to work in practice—an Act for good companies and the existing Indian Companies Act for bogus companies?—A. Not exactly that. There must be a rule making it clear that it should not be open to big concerns and to achieve this object the Act should define the maximum amount of share capital of a company under the Special Act.

Q. Under any Companies Act it is possible for a company to come to grief and there would be no private enterprise if there were no failures?—A. Taking the co-operative society. A co-operative society can get itself registered under the existing Companies Act. If a co-operative society is registered under the Indian Companies Act, nobody in the mofussil would put money in that society because it will not have the benefit of Government supervision.

Q. In the present Indian Companies Act safeguards have been provided to prevent bogus companies coming into existence?—A. Still there are bogus companies floated under the Companies Act. To a certain extent the companies registered under the Special Act will be under the supervision of the Government.

Hon'ble Sir R. N. Mookerjee.—Q. Will the people like it?—A. I do not think that Calcutta people will like it. I think middle class investors in the mofussil would like it.

President.—Q. You do not mean to say that the present Indian Companies Act is unsatisfactory?—A. It is unsatisfactory so far as small industries financed by the savings of middle class men are concerned, because there is not really sufficient safeguard except that every company must get itself audited by an authorised auditor or accountant.

Q. It is going a step further to extend the paternal attitude of the Government and to make the Director of Industries responsible practically for the soundness of these smaller concerns?—A. I do not think that the Registrar of Co-operative Societies is responsible for the soundness of the co-operative societies at all. He is not in any way responsible. He makes it very clear to the people that he is not in any way responsible for the safety of the movement and I have clearly stated in my note that registration under the special Act should not be regarded as a guarantee of solvency or good management.

Q. Would it not be equally good if the co-operative principle were extended to ordinary small industries like those you mention?—A. The co-operative principles should be applied to cottage industries, but I doubt very much whether small industries can be worked on a co-operative basis. I am suggesting a new machinery for those companies which are not big enough for a company or small enough for a co-operative society and for training the ordinary investing public in associated action.

Mr. C. E. Low.—Q. You are aware that the English Companies Act and the Indian Companies Act are practically identical?—A. Yes.

Q. And why is it there is so much trouble under the Indian Companies Act?—A. The English Companies Act is really the development of joint stock enterprise. Here you have practically no joint stock enterprise. We have copied the Indian Act *en bloc* from the English Act.

Q. In what way is the existing Act unsuitable for the smaller companies? Did it impose too many obligations on them?—A. It is not elastic.

Q. Do you want to move in the direction of greater restriction or less restriction? There ought to be restrictions, and when you know that the thing is not working well you ought to have a machinery to change that?—A. Under the Indian Companies Act it is very difficult to change even the articles of association or the memorandum of association.

Q. You wish to move in the direction of relaxing the law?—A. Relaxation but subject to proper safeguards.

Q. You would like to have it on the same or similar lines as the Co-operative Societies Act?—A. Yes. In the case of small industries we want an organisation by which the Director of Industries should promote small industries and be in charge of the working of the Act.

Q. You want a special Act for companies of the class satisfying these two conditions, they have got to be industrial companies and they have got to be small?—A. Yes.

Q. Should it be controlled by Government?—A. Not exactly controlled by Government. I have not thought over the matter in detail, but there should be some supervision, and the supervision should be legal in form.

Q. Could you carry it further and submit to us a note as to the detailed way in which it should be worked?—A. Yes. I shall very gladly do that.

Q. Turning to the report* on the Bankura Weavers' Relief which is appended to your note . . . ?—A. I have submitted it to the Government. I did not mean it for the Industrial Commission, but I should be very glad to answer any questions on it.

Q. Is this a fresh idea in Bengal?—A. It is an entirely new idea.

Q. It is a thing which is being done for the last 20 years in most of the provinces?—A. At least I do not know anything about it.

President.—Q. Why don't you know about it? Would there be no means by which you should know all these things?—A. I do not know.

Mr. C. E. Low.—Q. The inspector of weaving societies writes the report. Is he one of your men?—A. One of our men. I deputed him to make enquiries into the work of Bankura Weavers' Relief Committee.

Q. There is a post under you like that of the inspector of weaving societies?—A. Yes.

Q. How many weaving societies have you got?—A. About 25.

Q. Are they all over the place, or particularly in certain districts?—A. Most of them are in Birbhum and Murshidabad districts, and others are scattered here and there.

Q. The branch weaving schools are affiliated to Serampore?—A. Yes. The co-operative department has no connection with the Serampore Weaving Institute, and I do not see how there could be any connection between them. Our object is that as soon as the Department of Industries is constituted in Bengal, we should send down weaving inspectors to instruct these co-operative societies in improved methods of manufacture and other things and try to introduce improvements recommended by the Department of Industries. The Serampore school is a mere school for instruction. It has no out-door staff for sending it down to villages. There is one weaving master in Bengal and he is under the Director of Agriculture.

Q. He has nothing to do with Serampore?—A. No. It is rather a curious arrangement, but all the same it is a fact. When I asked for the creation of the post of inspector of weaving societies I suggested to Government that the inspector of weaving societies should know something about weaving but Government did not think it was necessary.

Q. This officer who inspects the weaving societies—does he do anything by way of helping them on the business side to purchase yarn?—A. He helps them in purchasing yarns and finding markets for them.

Q. Obviously the Bankura Weavers' Relief Committee seems to have a considerable difficulty in finding markets?—A. That Committee has been organised to assist not only those weavers who are receiving direct assistance but other weavers who are not receiving direct assistance from them, so they have made it a condition that they should not place their goods on the local market in order that the local market may not be flooded. The work is really carried on, not on a business footing but on a charitable basis.

Q. Have the ordinary co-operative societies with which your Inspector is concerned been successful in improving the market for their goods?—A. In many places he has been very successful in finding a market for them. At present I am organising a sale depôt in Calcutta and in fact I have taken rooms for the purpose and it is to be a sale depôt for the articles produced by the members of co-operative societies, because we found that unless we made arrangements for finding a market for their goods it was impossible to make any progress in organising co-operative societies.

Q. A discussion that we had with the Registrar and the weaving expert in another province led me to the conclusion that it was very difficult to run a co-operative credit society with success among industrialists for whose products a free market did not exist?—A. As far as Bengal is concerned we have a free market, except in the case of artistic industries and fine weaving.

Q. Suppose you increase your output by mechanical improvements and improvements in handlooms, would that market be still free?—A. Yes.

Q. In the case of the Bankura Relief Committee apart from the restriction which they imposed upon themselves in order to prevent injuring people whom they were trying to help, do you think that a free market exists for their products?—A. So long as these weavers were carrying on their occupation they were finding a market for their goods. It is only on account of scarcity and the fact that prices of yarn have gone up tremendously on account of the War and there is no fixity in the price of yarn, that they are experiencing difficulties.

Q. Leaving the War out of the question, you think that before the War they had a free market?—A. Yes.

Q. What other industrial societies are there apart from weavers?—A. They have three shoe makers' societies and two societies among carpenters, but then in the case of societies among carpenters they are merely credit societies, and we have not yet made arrangements for supply of raw material.

Q. Don't you find it necessary to train the men in co-operative idea, first of all, through credit as the soundest form of co-operation?—A. We begin that way and then we try other forms.

Q. Purchase and distribution?—A. Yes.

Q. In the case of shoe makers you have not got distribution?—A. In the case of shoe makers we have begun co-operative purchase and distribution of raw material. We have not made any attempt at co-operative sale because those people have a ready market.

Q. You cannot better their market?—A. Unless they improve the quality of their shoes we cannot find a better market for them. There is a good deal of local demand for the kind of shoes they make.

Q. You mention various cottage industries for which co-operative societies may be formed. Are you referring to credit as a rule or to co-operative purchase and distribution?—A. I refer both to credit and co-operative purchase and co-operative distribution. In all these things we must have co-operative purchase and distribution combined. It is desirable to begin with credit first to teach them the principles of co-operation.

Q. Whose function would it be to look after things like distribution and purchase?—A. I think that the Registrar should have absolute control over these societies, because the Registrar arranges for their finance, but then the Registrar should always be in touch with the Director of Industries and take his advice just as we are doing in the case of fishery societies.

Q. The Registrar should not be bound to register a society if he thought that it was not on sound lines?—A. Yes.

Q. You would also carry that a step further and say that you would not agree to your central bank financing any enterprise which you think is unsound even if it is backed up by the Director of Industries?—A. Yes.

Q. Hon'ble Pandit M. M. Malaviya.—What is the total number of co-operative credit societies in your province?—A. About 2,500.

Q. And of co-operative banks?—A. By co-operative societies I include co-operative banks.

Q. Can you tell us the number of co-operative banks as distinct from co-operative societies?—A. The bulk of the co-operative societies are co-operative credit societies and they are loosely spoken of as co-operative banks. There are other forms of co-operative society too.

Q. Do these co-operative credit societies help only agriculturists at present?—A. Yes, and also industrialists by which I mean cottage workers. Here and there some of those who own small factories are members of co-operative societies and take loans from co-operative societies to carry on their business.

Q. If these co-operative societies advance money to industrialists, why is there any need for your having a new institution to help cottage industries?—A. We want to start co-operative societies among cottage workers.

Q. Could you not do that under the present Act?—A. Yes.

Q. You only want to multiply their number?—A. So far as cottage workers are concerned.

Q. You speak of a more elastic Act to bring them into existence than the Indian Companies Act?—A. For supporting small industries.

Q. Cannot these small industries be assisted by co-operative credit societies organised under the present Act?—A. By small industries I do not mean cottage industries Act. I mean industries which are not very big concerns but which are on a small scale and financed by the savings of middle class men. They are too small for the Indian Companies Act and too big for the Co-operative Credit Societies Act.

Q. You suggest that machinery and plant on hire purchase system may be supplied to industries which have been co-operatively organised and then you suggest that they should agree to put themselves under the guidance of the Director of Industries?—A. There are really two propositions involved in that statement. The supply of machinery and plant on the hire purchase system to industries which have been co-operatively organised, and the supply of machinery and plant to small concerns which agree to put themselves under the guidance of the Director of Industries.

Q. What kind of guidance do you want the Director of Industries to exercise?—Is it mere inspection and report or more than that, actual supervision of the business of the concern?—A. It must be advisory. He cannot actually supervise.

Q. You do not mean that there should be actual supervision? You mean advice at starting?—A. Yes, but if it is read in connection with my suggestion of a more elastic Act, when the Director of Industries registers the concern, the concern must agree to put itself under the guidance of the Director.

Q. Suppose a more elastic Act does not come into existence, do you mean that the Director should offer advice as to machinery or as to the locality where the concern might be located general information and advice,—or do you mean anything beyond it? You have said that you do not want him to supervise the work?—A. I did not make any general statement. That will depend more or less upon the Director of Industries. If a company wants supply of machinery on hire purchase system, then it will be a matter between the company and the Government to make a contract as to the supervision that it will receive.

Q. You mean inspection of machinery as one thing?—A. Inspection of the general work too.

Q. Supposing the Director comes and expresses an opinion and the manager of the firm finds that that opinion is not sound, whom would you wish to go to to decide the matter?—A. That will be a matter of contract. When a company wants to take machinery from Government on easy and reasonable terms, the company must enter into an agreement with Government and the agreement to be entered will depend upon the particular circumstances of each case.

Q. Do you think that people will be willing to bind themselves to be guided by the advice of the Director of Industries in preference to that of the manager of the firm?—A. If the Director of Industries finds that a company which wants machinery is entirely in the hands of wrong men, he might insist that they should be guided by his advice before he could recommend to Government that that machinery should be given to the company. I want that the Director of Industries should have a free hand, as a matter of fact. The company may not take the machinery if the Director insists on impossible conditions.

Q. Suppose he is an incompetent man?—A. Why do you have an incompetent man in the first place?

Q. Suppose the manager of the company is satisfied that he is working on right lines?—A. Let him raise money personally and let him not come to Government at all.

Q. You say that the Director should be given special supervisory powers over concerns registered under the Act that you propose. Suppose the Government thinks that the Director should not have such supervisory powers, then would that stand in the way of your having a more elastic Act?—A. In that case I would not have a more elastic Act.

Q. You say that an appreciable progress may be made in industrialism in this country if people learn combination and co-operation. What steps would you suggest to develop joint stock enterprise apart from the proposal of a more elastic Act? Have you any other proposal to make?—A. I do not think there is anything else except propaganda.

Q. Have not pamphlets been issued in Bengal to inform the people generally of the value of co-operative credit societies?—A. Yes.

Q. And is the work being carried on even now?—A. Yes.

Q. Do you mean that that should be done on a larger scale and more vigorously in the case of joint stock enterprise?—A. Yes. It is being done in the case of co-operative credit societies.

Q. You want it to be done in relation to joint stock enterprise also?—A. Yes.

Q. Have you any definite points to urge against the present Indian Companies Act? You say that it is copied from the English Act, but have you anything definite to suggest?—A. I am afraid I have nothing definite to suggest. That is the general impression which I have.

Q. You say that where there are sufficient industries to be financed a separate bank may be had?—A. Yes. At present, if you begin with an industrial bank you would not get sufficient industries to finance.

Q. Where will these small industries that you wish to promote receive their financial support from?—A. For the present they may receive financial support from the Government or take loans from the presidency banks on Government guarantee or anything like that.

Q. Suppose the Government do not see their way to advance loans directly to finance industries and suppose the presidency banks cannot help small industries, would you in that

case advocate the establishment of an industrial bank to help these industries or not?—A. My apprehension is that if you start an industrial bank at once you may not have sufficient scope for lending out your funds. An industrial bank should be organised on a very big scale to be a success.

Q. You think that there are not a sufficient number of industries at present to feed a separate industrial bank?—A. Yes. It can be done in conjunction with other work by the existing banks, but for an entirely separate industrial bank I do not think there is scope.

Q. Have you heard that people find great difficulty in obtaining money to finance their industries?—A. Yes.

Q. Do you think that that complaint is well founded?—A. In some cases it is.

Q. What suggestion would you make to meet their requirements?—A. Direct Government loans or loans from the presidency banks for the present, till a sufficient number of industries are organised in this country to make it worth the while of any one to start an industrial bank.

Q. Would you fix any limit as to the size of the industry, as to what industries money should be lent directly?—I cannot say.

Q. Are you aware of any efforts being made to employ the principle of co-operation for the sale of products?—A. In the case of cottage industries we are doing that.

Q. Do you find that it works well?—A. So far it has worked well but it is still in the experimental stage. I cannot make any definite statement.

Q. You do not want the Government to follow the principle of *laissez faire* in the matter of industries?—A. No.

Q. You say that the best way of improving the labourer's efficiency and skill would be to introduce primary education among the artisans. You do not want to confine it to artisans?—A. No.

Q. You want it to be general?—A. Yes.

Q. And you would bring that instruction into touch with their occupations by putting in some manual training later on, some training in their particular industry and the technicalities of their art?—A. Yes.

Q. You say at the end of your note, "The Director of Industries should try to develop joint stock enterprises very much in the same way as the Registrar of Co-operative Societies tries to promote the development of co-operative societies." Would you advocate a propaganda similar to what your department have been carrying on, to point out the benefits of joint stock enterprise?—A. Yes.

Q. And also to convey information as to what industries can profitably be worked?—A. Yes.

Q. And also information as to the markets for the different kinds of industries?—A. Yes.

Q. In fact, you would expect your Director of Industries to constitute a bureau of information for supplying more commercial and manufacturing information?—A. He might get the information from a separate bureau of information. At any rate, he should be the medium of information.

Q. With regard to raw materials, where machinery can be had, and where finished product may be disposed of?—A. Yes.

Sir F. H. Stewart.—Q. Will you develop your answers to questions five and six a little more clearly in a short note,* stating what difficulties there are at present and what your suggestions are for meeting them?—A. Yes.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. You say you do not find any difficulty in getting money at six to seven per cent.?—A. Yes.

Q. For what periods?—A. Four years, three years.

Q. Then you can easily lend to these industrial societies too?—A. We are lending them money.

Q. About the Director of Industries, suppose he was touring to inspect industries, how are the Board's meetings to be held, how could they manage their affairs if nothing is to be sanctioned unless the Director passes it?—A. The Director of Industries would not manage the industrial concerns at all. He will only supervise and his power of supervision should be limited by the Act. The Registrar of Co-operative Societies under the Co-operative Societies Act has not unlimited powers at all. He has got very limited powers, much more limited than people imagine.

Q. Have you any unions here?—A. Yes.

Q. You say, "In developing industrialism in India we should try to avoid the worst aspects of modern industrialism in Europe." May I know what they are?—A. We know the evils of modern industrialism very well. Crowding in towns and all sorts of things.

* Not received at the time of going to Press.

Q. You would also have factories in the cities?—A. At the same time we should keep our cottage industries alive. You should not pay exclusive attention to starting and developing mills and other things.

Q. Of course the cottage industries must go on and mills ought to go on too?—A. Yes.

Q. You say that the Director of Industries should be directly under the provincial Government, and at the same time you say that he should be a sort of intermediary between the Imperial department and the local industries and that he should bring all improvements which the Imperial department recommends to the notice of local industries. Must he correspond through the Local Government?—A. It will mean too much delay.

Q. What is your objection to having a man from the Imperial department?—A. He must know the local conditions. It will take a long time for him to know. He must be a provincial man.

Q. He may be a service man?—A. To begin with, my idea is that it is better to have a service man.

Q. How could he have any idea of industries?—A. But then he will have the Imperial department to advise him.

Q. Do you think it would be workable to have the Director of Industries under the Local Government always communicating directly with the Imperial Government?—A. So far as the business side of the industries is concerned.

Q. The Government can appoint a local man as Director of Industries under the Imperial department. They can easily do that?—A. I do not think that will work well. There will be a good deal of friction between the provincial Government and the Director of Industries if he is an Imperial man.

Q. You want the Director appointed by the Local Government, should directly communicate with the Imperial Government?—A. With the Imperial department and not with the Imperial Government. The Department of Agriculture always corresponds with the Imperial Agriculturist direct.

Q. With the sanction of Local Government?—A. There is general sanction, I think, to correspond on technical matters.

Mr. A. Chatterton.—Q. With reference to your answers to questions 5 and 6, you make certain suggestions. Are they based on actual experience of difficulties in connection with small industries?—A. It is based on a general impression of them and not on actual experience.

Q. You promised to submit a note on the subject, and may I suggest that you should first enquire as to how these difficulties have actually been dealt with in other provinces. You may get information as to how they have been dealt with by the existing agency. You are proposing an entirely new method of dealing with them and asking for special legislation?—A. The Registrar of Co-operative Societies in other provinces have nothing to do with industries.

Q. If you suggest that special legislation is necessary for these industrial companies which are too big to be dealt with under the Co-operative Societies Act, should there be any limit to the size of the society as regards financial transactions?—A. Yes. There should be such a limit. Small industries cannot be dealt with by the Co-operative Societies Act because when you start an industry you want to make as much profit out of it as possible. Industries cannot be dealt with co-operatively, except cottage industries.

Q. You have been talking about these industries, but you have not mentioned any specific one of the class that you want to deal with under this Act?—A. Take, for instance, the Rangpur Tobacco Factory Co. That is a small company financed by the savings of middle class men. That is not a big company. There are a lot of fishery companies started, which are absolutely bogus and useless, but the Registrar cannot but register them so long as the articles of association and the memorandum of association conform to the requirements of the Act. The Registrar of the joint stock companies is bound to register them.

Q. What was their capital?—A. Sometimes Rs. 10,000 sometimes Rs. 20,000 and sometimes a lakh of rupees. They are absolutely bogus. They play on the general ignorance of the people in the mofussil and get money from them and after two or three years we hear no more of them.

Q. Is it not possible to deal with these under the existing law?—A. No.

WITNESS No. 165.

MR. A. C. CARR, A. M. I. M. E., Chief Mechanical Engineer, Bengal-Nagpur Railway. *Mr. A. C. Carr.*

WRITTEN EVIDENCE.

Qs. 44-51.—There is at present a scarcity of competent skilled handicraftsmen in the various trades on which mechanical and electrical engineering depend and there is great difficulty in obtaining competent foremen and chargehands for the subordinate supervision of engineering workshops. Training of labour and supervision.

Most of the large railways in India have systems of apprenticeship for Europeans, Anglo-Indians and Indians, but the demand latterly, owing to the continued expansion of railways, the mining and other industries requiring trained mechanics, has exceeded the supply from this source. Railway workshops would seem for some years to come, as in the past, to continue as the principal training ground for skilled mechanical handicraftsmen.

It is impossible to expect either technical colleges or industrial schools to meet a demand of this nature, and money spent on such institutions with the object of turning out skilled handicraftsmen is money wasted. Apprentices in a large workshop are influenced by the standard of workmanship maintained by a number of skilled workmen, to a degree which is impossible in an institution where there may be only one or two skilled instructors, such as a technical college or industrial school, in which the majority are learners.

As a rule lads trained exclusively in a technical college or an industrial school are never competent to supervise and carry out the practical operations required in the workshops, and I have never been able to employ such lads advantageously owing, in the first place, to their want of knowledge of practical operations, and also to the impossibility of paying the salary which the possession of certificates might perhaps have led them to expect.

The standard of workmanship in an Indian engineering workshop is much more easily improved by example than by instruction; it is therefore necessary that foremen and chargehands should be experts in the particular work which they supervise.

Apprentices for training in railway workshops are recruited from three classes:—

- (1) Europeans or Anglo-Indians.
- (2) Illiterate or partly illiterate Indians.
- (3) Indians of some education.

The standard of general education of the European and Anglo-Indian lads offering themselves as apprentices is, with few exceptions, lamentably low, and this is a severe handicap to instruction in the theoretical subjects allied to their practical work. Standards of education appear to vary in the various provinces and, in the case of the children of railway employes, liable to transfer on a railway which may traverse two or more provinces, the want of a uniform standard is somewhat of a difficulty.

The larger proportion of skilled mechanical labour is recruited from the Indian agricultural classes who as a rule are illiterate, but many of this class, in spite of this very great handicap, develop into first class workmen when associated with competent foremen and chargehands, and with opportunities given for suitable education when young, would in years to come be competent foremen and chargehands and possibly rise beyond that grade.

Possibly due to the fact that skilled handicraftsmanship is at present usually accompanied by illiteracy, until quite recently Indian lads of education have not taken to work necessitating skilled manual labour; there is, however, an indication that this reluctance is disappearing. The prestige, however, attached to Government appointments and the legal profession apparently induce many parents to maintain their sons in schools or colleges, with this object in view, to an age beyond that suitable for starting life as a mechanical apprentice, with the result that in many cases the lads eventually drift into clerical or similar work with little prospect of advancement. For the educated Indian lad who undergoes a thorough workshop training and takes opportunities given him of theoretical instruction during this period, the possibilities for his advancement in years to come should be many.

The standard of education of the educated Indian lad offering as apprentices is higher than that of the European or Anglo-Indian lad and it would appear possible to start technical classes on a higher level than is possible with Europeans and Anglo-Indian lads. It is impossible at present however to say whether Indian lads of this class will continue to come forward and undertake practical work in workshops; all that can be done is to provide the opportunities.

In connection with their system of apprenticeship some of the larger Indian railways maintain technical schools for their apprentices, receiving a small grant from Government in their aid. Some of these schools hold classes at night and I believe some hold them during the day.

The Bengal-Nagpur Railway, with which I am connected, have provided a comfortable home for European and Anglo-Indian apprentices, supervised by a matron, and in the same building are situated class-rooms in which technical classes are held in the evening; certain classes are also held for the educated Indian apprentices we have at present. We also hold classes in the evening for Indian apprentices who are illiterate or nearly so, where they are taught reading, writing, elementary arithmetic, and drawing. I may say this class has shown that they appreciate in a marked degree the opportunities we have been able to give with our limited resources.

I have been engaged on Indian railways for 25 years and I am firmly of opinion that, considering railway workshops must be looked to for some years as the principal training ground for skilled mechanical labour, and from the point of view of the dependence of the development of indigenous industries on this labour, it would be sound policy to treat the question of training Indian apprentices in railway workshops from a much broader point of view in future than that of meeting individual requirements.

It is suggested that the scope of existing railway technical schools should be extended considerably at the principal railway centres; they would be subject to the control, as at present, of the Education Department, but the course of studies should be subject to the approval of the Locomotive and Carriage Superintendents' Committee of the Indian Railway Conference Association; this committee is composed of mechanical engineers controlling large bodies of men in all mechanical and electrical trades on all the railways of India.

Additional facilities for training apprentices in Indian railway workshops will doubtless involve extra expenditure in supervision, quarters, hostels and schools run in conjunction with workshop training. Such expenditure might, however, be met by diverting some of the funds at present allotted to the Education Department. Under such conditions, practical training in real workshops and theoretical instruction would run concurrently at a time of life when a lad's mind would be in its most receptive condition, and practical and theoretical training would appear in their proper relation to each other.

The best of the lads who have been through these proposed schools run in conjunction with railway workshops might be given some opportunity of either entering some college or university, where a degree in mechanical engineering could be obtained, or else, if competent, without further instruction, of entering direct for such an examination. Some such scheme, which is simply a proposal to extend existing organizations, would go far to promote the education of the country in the mechanical engineering industry on practical lines.

(Witness here gave confidential evidence.)

Many of the large Indian railway shops are well organised and equipped with the most modern plant and machinery and the work turned out of them compares favourably with that of some of the best shops in the United Kingdom. It should therefore be possible for Indian apprentices, provided proper opportunities for technical instruction are given, to obtain as thorough a training as could be obtained in the United Kingdom.

As regards European and Anglo-Indian apprentices, the case is somewhat different. There is always a tendency to look on at an Indian workman than actually do the work, and I have always encouraged such lads to go to England for a couple of years or more when their apprenticeship is ended where they must do their fair share of the work in a workshop. In many cases I have obtained employment for such lads in railway and locomotive workshops and such men, whose interests are bound up with India, on their return are likely to develop into extremely useful men.

Considering the unlimited supplies of raw material in India, possibilities in the General mechanical and electrical engineering industry are great. Expansion in steel and iron works, including the manufacture of plates, sheets, tyres, axles, spring steel and sections of all sizes would probably be necessary prior to any very marked progress in an indigenous mechanical engineering industry and also an adequate supply of skilled mechanical labour.

Any discussion of labour questions in India which omits some reference to the housing question cannot be considered complete. It is impossible to expect any improvement in the labourer's efficiency and skill if comfortable housing accommodation is not provided and measures of sanitation adopted.

It is possible at present for any new industrial settlement laid out with the greatest care and maintained in a high state of efficiency to be threatened by epidemics originating in the various bustees which eventually spring up on the boundaries. These bustees are under no control either as regards laying out or sanitary maintenance, and with the possible growth of new industrial settlements in India, are an evil which requires attention.

Whatever the amount of land taken up for the purposes of an industrial settlement, I do not suppose it will ever be possible to prevent the springing up of villages immediately outside the boundary of a settlement, but it should not be difficult to enact that such villages within a radius of one mile should be laid out with wide streets with due regard to prevailing direction of wind and other features tending to effective sanitary measures being made possible.

ORAL EVIDENCE, 3RD JANUARY 1917.

President.—Q. Your note brings many facts that we have already come across. There is one point that I should like to ask your opinion about and that is the reason why young boys do not go into engineering so much as in the case of law and medicine, where if they fail they then turn their attention to engineering with the result that they take to engineering very late in life to be of any value. In addition to that there is the point that the boys who go into engineering do not get the opportunity of rising to the top of the profession as in the case of law. They are therefore moving in a vicious circle. Can you tell us how we could get over this trouble?—A. Until quite recently we have never had any educated Indian lads at all.

Q. If the boys do go and prove their worth then they get a chance?—A. It all depends on the boy himself. It is the same in the profession of law. When a man studies law, he does not know what he is going to rise to.

Q. Do you find that the European and Anglo-Indian boys are lower in standard of education?—A. Much lower.

Q. Don't you get boys from schools like the St. Joseph's?—A. We get boys from all over India. A few are fairly well educated. It is very difficult to start theoretical training in the case of some of the lads who have not a proper grounding.

Hon'ble Sir R. N. Mookerjee.—Q. Is it not the general impression that Indians should not be allowed to occupy places where they would have to control Europeans?—A. I think that the real reason is that they do not start at the bottom. The question of prejudice has never arisen. Existing conditions do not admit of such a supposition.

President.—Q. Have you tried boys from Sibpur?—A. We have had one or two. They did not have enough practical experience.

Q. What age?—A. From 19 to 21. I cannot say that I have had very much experience with them.

Q. Do they come from the apprentice department?—A. I cannot tell you offhand.

Q. Are they trained in electrical engineering?—A. I suppose so, up to a certain point. But still in a college of that sort a boy does not get the actual experience that he would get in a workshop. Without proper co-ordination of theory and practice I do not see any prospect of progress.

Q. Have you had anything to do with the proposal to establish a technical college at Sakchi?—A. No.

Q. The proposal has been considered by a small committee and the idea is that they should establish a technical college at Sakchi which will be devoted largely to the metallurgical side. That of course would necessarily include electrical engineering. Would not your own province be sufficient to justify anything of the standard of a college?—A. I have suggested that in my note. I suggest that in all large railway centres our present system of night schools should be very much extended so as to give more provision for education of that sort. In Sakchi mechanical engineering is subsidiary to the manufacture of steel and iron.

Q. Do you want any Government assistance in this matter?—A. I propose that the whole scheme should be financed by Government. It is not part of the duty of the railway company to do what I suggest. The railway is only justified in providing for its own requirements which it has done.

Hon'ble Sir R. N. Mookerjee.—Q. Would the railway co-operate with the Government?—A. That is my proposal.

President.—Q. What would you provide?—A. Hostel accommodation for students and a staff of competent teachers.

Q. And facilities for training in the workshops?—A. Yes, so that theoretical and practical training may go hand in hand.

Sir F. H. Stewart.—Q. Would it be a development of what you have already?—A. Yes, I think the details may be arranged later on when the scheme is further developed.

President.—Q. Do you think there is room at Khargpur for an engineering college with or without Sibpur?—A. I do not think the Sibpur College meets the conditions at all. As regards civil engineering it does. As regards mechanical engineering it does not.

Q. Would you like these colleges to specialise, one for civil engineering at Sibpur, one for mechanical engineering at Khargpur and one for metallurgy at Sakchi and so on?—A. I propose that such institutions should be established at all large railway centres in the country. It seems to me that a large part of the money spent in technical education might be utilised for this purpose to better advantage.

Q. How many students would you get in the higher grade college at Khargpur?—A. I do not propose to establish a higher grade college. A school would be sufficient where education up to a certain point might be given. After that they might go to a higher college or a university where they might get higher instruction in scientific subjects.

Q. You do not propose to have an institution there that would train a boy in the theoretical side of mechanical engineering and electrical engineering beyond that required for a foreman?—A. That may be done eventually. What I propose now is only for the average lad. The clever lads can well look after themselves.

Sir F. H. Stewart.—Q. In that case would it be necessary to send Anglo-Indian boys home?—A. As a rule I do not think it would be necessary. They can be sent occasionally.

President.—Q. Have you had any experience of the scholars who are sent to England?—A. The men I refer to go on their own initiative.

Q. You have never met a returned scholar?—A. No.

Mr. C. E. Low.—Q. What pay do these foremen and chargehands get?—A. As regards the chargehands it varies from Rs. 200 to Rs. 250 a month and the foremen go up to Rs. 500.

Q. With reference to what you say about the lads trained in a technical college or an industrial school, I suppose you never had instances of men coming for employment who have been in a technical college or school and taken apprenticeship and then came to you for employment?—A. No. I have had many applications from men who have been in technical schools. They produce certificates but a few questions showed that they were not competent to undertake any work in the shops.

Q. Do men come to you from Sibpur as apprentices?—A. I have not had any applications from such men.

Q. In connection with what you say regarding the education of apprentices, can you say what sort of education they have had? Are they failed matrices?—A. We have laid down a certain standard of education. Our conditions are that the candidate must undergo some preliminary mental and physical test to find out his general fitness. He must produce a certificate that he is between 15 and 17 and he must also produce a certificate of character from a respectable person and from the school where he was last showing that he has at least passed the 5th or the 6th standard.

Q. Are these young men mostly Bengalis?—A. Some of them are.

Q. Are they of the Bhadralog class, that is the educated middle class?—A. I suppose so. Their fathers are clerks and men of that class.

Q. When did you make this offer to educated Indians?—A. Early last year.

Q. What was your reason in making that offer?—A. It was chiefly due to our own requirements. In our staff we have 16,000 men and the recruitment of the staff is a very important consideration. Railway carriage building in India although perhaps not generally known is a very important industry. The Bengal-Nagpur Railway alone has spent 10 lakhs a year for the last five years on new carriages. The difficulty has been to find competent men to supervise the construction of new carriages. The ordinary Anglo-Indian boy with traditions of the past is inclined to go to the locomotive shop. Carriage building has never had a proper standing in India and the opportunity was taken to get another class which had no traditions at all and this scheme which was accepted by the Bengal-Nagpur Railway was instituted. So far the scheme has been successful and the lads are doing very well indeed. We have got 20 odd lads now.

Q. Had these any previous training?—A. None at all. We took them as apprentices and in drawing up the scheme we were of opinion that it would be advisable to be precise about what the prospects would be. I was not actuated by any other reason except that of providing for our own requirements. We tried to make the prospects a little better than would be the case if the lads took up clerical positions.

President.—Q. Your prospects are little better than if they entered as clerks?—A. The prospects are very clearly laid down. Beyond a certain stage it all depends upon the man himself.

Q. These men will be qualified to be chargehands and foremen?—A. Yes.

Q. They can rise to Rs. 500?—A. It depends entirely on the lad what they eventually rise to.

Mr. C. E. Low.—Q. What are your shop hours?—A. 7 to 11 and 12 to 4-30.

Q. Have you had any trouble about unpunctuality so far?—A. Not so far.

Q. Where do they live?—A. With their parents and guardians who are at Khargpur.

Q. What pay do they get when they come in?—A. I think they start on R15 a month and in the next year R17, R19 in the third year and so on and in the fifth year R25.

Q. They pay no premium of any kind?—A. No.

Q. What class of men do the teaching?—A. Our own office staff, the foremen and the chargehands.

Q. Are not these men too tired to be able to profit by the teaching?—A. They manage it all right. We have two classes a week. We cannot do more.

Q. Because of the shortage of staff?—A. We have not got sufficient staff.

As regards the pay I said that they get R25 in the 5th year. Under the agreement they can go up to R100 a month. After that the boy's prospects are in his own hands.

Q. You have done a good deal in the way of housing the employes. Do you find that sanitary surroundings and things of that sort have an effect on their efficiency?—A. Undoubtedly. If a man has got a comfortable home that re-acts on his efficiency as a workman.

Q. Do those men who have not houses show any desire to get houses from the company?—A. Very great desire. There is always great competition for the houses. We can never keep pace with our requirements.

Q. Do these Indian artisan classes take to any particular form of amusement or recreation?—A. In Khargpur we have an Indian institute where there is a library. There are billiard tables, tennis courts and other forms of recreation.

Q. That is for the superior Indian staff?—A. As regards the other staff there is a project on foot to provide a recreation ground for football, etc.

Hon'ble Pandit M. M. Malaviya.—Q. Were you educated at any university or at some works?—A. I acquired my knowledge both at a college and at the works.

Q. What university?—A. Durham College of Science.

Q. Did you have any good workshop attached to the mechanical engineering department there?—A. There was no workshop at all. I served my time in the shops of the North-Eastern Railway.

Q. That was after receiving the theoretical instruction?—A. It was at the same time. I used to attend the classes in the evening. How many days in the week?—I cannot remember. It is a long time ago.

Q. How far were these works situated from the college?—A. About a mile and a half.

Q. And what was the total number of students that used to attend the college?—A. I cannot remember that. It was over 25 years ago.

Q. Supposing you had a workshop attached to the Durham College, fitted with modern machinery appliances, and you went there for practical training, would that not have suited you equally well?—A. No. The spirit of a workshop is never present in a workshop attached to a college.

Q. In what way?—A. In a workshop attached to a college you are never face to face with realities. In a workshop you are up against real difficulties. Moreover in a workshop attached to a college you cannot have more than one or two skilled instructors.

Q. If there were a larger number of them?—A. At the most you might have half a dozen. In a workshop you will get more practical instruction than if you simply attended lectures or demonstrations. Moreover there is the spirit of the workshop which can never possibly be obtained in a college workshop.

Q. In your opinion is the theoretical part of the instruction much better imparted in a college?—A. You cannot get theoretical instruction in a workshop.

Q. But theoretical instruction is also valuable?—A. Quite so. My point is this. Theoretical training and practical training must go hand in hand. The practical training you must get in the workshops. Theoretical training you must get in the college.

Take for instance the University of Birmingham. They provide mechanical training, and it is throughout experimental.

President.—Q. That is only in the Calendar?—A. In practice it is not so.

Hon'ble Pandit M. M. Malaviya.—Q. I only want to clear this one point. Suppose you had a college where instruction is imparted both in the theory and practice of mechanical engineering and if the student undergoes a certain standard of examination, is he not likely to be more successful than one who has not had such previous grounding?—A. I think the only practical training for a mechanical engineer is in a proper workshop; and theoretical instruction should be had at the same time.

Q. You say that you have only two evening classes?—A. That is simply due to shortage of staff and accommodation.

Q. Do you think that you will be able to take a larger number of students who may wish to take up mechanical engineering?—A. There is no accommodation and it is simply a question of accommodation.

President.—Q. You are taking 20 every year. That brings it on a level with Sibpur?—A. I do not suppose we take in 20 every year. At present I am going into the question of hostel accommodation and the housing of the staff. I do not propose to ask the railway company to build a hostel. It is a question for the Government. I find that the Allahabad University had a very large sum for building hostels for law students. It seems to me that engineering students are just as important as law students especially at the present time when engineering has turned out to be one of the essentials of the existence of a nation. I do not know whether you can say the same thing of the profession of law.

Q. Your proposal comes to this, that you want to establish a college close to the works?—A. Quite so.

Q. Do you think that if the number of students increases the railway company will have no objection to give them facilities for practical training?—A. I do not think so. I am not speaking of the Bengal-Nagpur Railway only. The State railways could do a great deal to assist in the matter.

Q. If one central thoroughly equipped first class mechanical engineering college is established near some railway works and provision is made for training a sufficient number of students would not that be useful?—A. That is not my proposal. My proposal is to establish a technical school at all important railway centres, such as Jamalpur, Kanchrapara, Lahore and so on.

Q. Does the standard of education that you have prescribed, namely the 5th standard, suffice?—A. Yes, so far as we have gone. He must have a good general education before any theoretical instruction is possible.

Q. When they come to you they have no training in drawing and manual work?—A. Not more than what they get in the ordinary schools. A certain amount of manual instruction is given.

Q. If they had a certain amount of manual instruction that would be better?—A. It should not be at the expense of general education. It should be in addition to the general education.

Hon'ble Sir R. N. Mookerjee.—Q. Under your proposal would you want any agreement that they must serve you for a certain period of time?—A. That would be part of the agreement. They must serve us for a certain period of time before they go out for themselves. That is our system at present.

Q. From what you have just said may I take it that the Bengal-Nagpur Railway would be prepared to take a certain number of students every year?—*A.* We have at present 143 apprentices of whom 125 are illiterate. We have got a night school where we teach elementary subjects, reading, elementary drawing and arithmetic and they are doing very well. Our attendance is 90 to 100. For this school we get nothing from Government.

Q. May I also take this as an authentic information to be used by me if necessary in moving the Government of Bengal to make some arrangements with your railway to send some boys from Bengal?—*A.* This is only my personal proposal. Our Agent, Mr. Godfrey, reminds me that our present scheme has the approval of the Home Board. The present suggestion has never been put before the Bengal-Nagpur Railway Board at all. I am not therefore in a position to say anything definitely about it. But from the sympathetic way in which the Home Board treats such questions I think they would support it.

President.—*Q.* You would only gain and not lose. You would be able to get the pick of the men for your work?—*A.* I put the matter not from the point of view of the Bengal-Nagpur Railway but from a much broader point of view. I am suggesting that it should be done in all the big railway centres.

Hon'ble Sir R. N. Mookerjee.—*Q.* If you train up a certain number of boys in Khargpur they would be available not only for your work but also for the engineering firms in Calcutta?—*Q.* That is quite so.

Q. And the surplus might find employment, say, in Lucknow and other places. If a boy gets training in your shops and he gets a certificate of competence he would value that certificate as a passport that would lead to his success in his future career?—*A.* Yes, but if there were more men trained in other parts of the country we might get the benefit of the men trained in other places also.

Q. It would be difficult to ask the Government to help if you are going to take them under your service?—*A.* That is only under certain limitations. That is for, say, two years. After that they can go away.

Mr. A. Chatterton.—*Q.* Assuming that your proposal is carried out would you advocate the abolition of the mechanical engineering classes in the various engineering colleges that have been started such as at Sibpur?—*A.* As regards the mechanical portion I cannot say very much about it. With the exception of a very few cases I have not been able to give lads from Sibpur work. They do not seem to have the training that we want. My proposal was that there should be some opening for higher education which will be available for lads who pass through these works.

Q. At the end of a course of, say, five years they might go to a larger college of university rank?—*A.* Yes.

Q. How long would it be necessary to be there?—*A.* I think about two years.

Q. You say that money spent on industrial schools and colleges is wasted. Can you tell me from what industrial schools these boys come?—*A.* I said with a view to provide handicraftsmen from a variety of places.

Q. Have you had any from Kalimpong?—*A.* I do not think so. We have had from Ranchi.

Q. I should like to know if the training the boys have had is adequate or whether they come with swollen heads and demand that they must be given so much pay?—*A.* That is the condition I generally find. The man comes with a certificate, and he wants to be put in charge at once. If we put him into a fitting shop and ask him to do a certain piece of work he knows very little about it and I cannot therefore employ him. A man who begins at the bottom is able to turn out much better work and he works on a much smaller pay than these men demand.

Q. What pay would you be prepared to pay these men from the industrial schools who come to learn as workmen?—*A.* I think 6 or 7 annas a day.

Q. Do these men want more?—*A.* Yes. But they are found useless. The training that they get is not of any use to us.

President.—*Q.* Have you got anything to say by way of supplementing your note?—*A.* I would like only to allude to what I say at the end of my note regarding the quarters for the workmen. If a new industrial settlement is laid out there is a chance of bustees springing up on the boundary line without any plan or control. If it is affected with any disease it is likely to threaten the settlement. I believe that at Sakchi the same trouble is starting. My proposal is that in connection with new settlements there should be an enactment which will prevent these bustees springing up in their own way. They should be laid out in a way as to make sanitary measures effective. I suggest that within a mile beyond the settlement no bustees should be allowed to spring up except with broad streets and with proper safeguards for their sanitary condition. I am referring only to settlements that may be built newly in future.

Q. You do not object to settlements being formed if there is proper supervision and sanitary arrangement?—*A.* At present there is no provision to enforce the observance of sanitary principles. My suggestion is that in the case of a new settlement there should be a zone in which people if they want to build bustees will have to do so having regard to broad streets and such other precautions as will make sanitation effective.

Q. Whose business will it be to look after this?—*A.* I presume the Collector of the district.

Q. Have you got a municipality at Khargpur?—*A.* We have got a station committee which is responsible for the administration of the place.

Q. Have you heard of other cases so that a general memorial may be made with a view to Government taking action?—A. I heard that at Sakchi there was very much the same condition.

Q. The area could be declared a municipal area beyond the actual settlement?—A. I do not think that would meet the case.

Hon'ble Pandit M. M. Malaviya.—Q. What is the population there?—A. I think about 22,000. If you declare it a municipal area that will only put off the evil day and the trouble is bound to recur again. That is my point. The municipality would have a boundary and beyond that boundary the whole trouble will start again. My point is that beyond the boundary of the municipality there should be a certain area in which villages would be built in a certain plan.

Q. You want a suburban area marked out for every municipality?—A. That is so.

WITNESS No. 166.

Mr. L. Gould.

MR. L. GOULD, *General Manager, Kumardhubi Fireclay and Silica Works, Limited.*

WRITTEN EVIDENCE.

Goods of silica,
fireclay and
magnesite.

I have pleasure in offering my views on matters with which I have had practical dealings in India during the past 11 years.

The manufacture of refractory goods of silica, fireclay and magnesite in this country has considerably improved during the past few years and this has been brought about chiefly by co-operation between supplier and consumer and also by improved manipulation by operatives due to practical demonstration and the introduction of up-to-date machinery and appliances.

Magnesite bricks were not made in India two years ago but to-day the Indian magnesite brick is of equal quality with the best brands formerly imported, considerable strides are also being made in the manufacture of silica goods, whilst in most cases the country firebrick has taken the place of those imported and have been proved to be equal to European firebricks.

India is now practically in a position to supply all the firebrick material required and considerable quantities are being shipped to Ceylon, Burma, etc., and the demand is increasing. The expansion of the fireclay industry depends to a large extent upon the further expansion of the iron and steel trade, mineral smelting works, bye-product coke ovens, and coal distillation plants, etc., and also to the discovery of new sources of raw material, because so far as has yet been proved India is not overburdened with refractory material.

I consider Indian labour in this particular industry capable of turning out just as good work as that of any other country although operatives are much slower, and attendance uncertain, there is a tendency for the Indian, as in other countries, to strike work when improvements are made such for instance, upon the introduction of mechanical installations, another difficulty with Indian labour is caste prejudice and the refusal of those with even a little education to soil their hands, consequently it often happens that a useful workman deserving advancement has to be retained at the bench because if raised to a foreman his practical services cease, he goes no further and expects to be allowed to look on.

Elementary education is very necessary for the improvement of native labour but this should not consist of mere writing and reading in English, good Hindusthani or Bengali education would be preferable if combined with some form of elementary practical technical instruction for the improvement of the handicraftsman as all operatives cannot be foreman and clerks.

The Government could give assistance by providing a central laboratory with complete appliances for analytical and physical research and testing of raw materials, but this would only be of use provided that such an institution is conducted by a specialist thoroughly acquainted with refractory materials and able to give sound practical advice, a purely theoretical institution would not help the industry very much.

I consider there is an opportunity in this country for the manufacture of glazed sanitary earthenware goods and the Indian potter will be capable of turning out ware of an equally good quality to the imported, provided that he receives the training usually available to workmen abroad. The introduction of new sanitary schemes for villages and towns, and improvements on existing installations, will in the near future offer extensive scope for sanitary pottery. I consider Government could select a suitable clay-bearing locality and erect a pottery school for the practical training of Indian labour, such training to be efficient would need be conducted by men capable of showing the Indian how to use his hands, drawings and oral instructions are all right after operatives have a fair knowledge of the business but practical training is the main and first consideration and absolutely necessary.

I consider that Government financial aid is not required in the brick, tile and pottery trade, there is ample money available and provided factories are properly constructed, equipped, and managed finance is available when there is confidence in the management and control.

ORAL EVIDENCE, 3RD JANUARY 1917.

President.—*Q.* You suggest that Government should provide a central laboratory for testing raw materials, and I suppose finished products also?—*A.* Yes.

Q. You want to get Government certificates for finished products?—*A.* I want expert advice.

Q. I don't suppose that any central laboratory established by Government could ever supersede your knowledge in the matter which you have specially studied, the manufacture of magnesite bricks?—*A.* We want analytical and physical tests to be done.

Q. But don't you make your own physical tests?—*A.* We have to get it done, but the test cannot be depended upon. Mr. Briggs does most. Messrs. Tata do their own tests, and outside of that Mr. Briggs does most of them.

Q. You really want some established authority so that you could get a certificate that you would issue with your materials?—*A.* For instance, a small variation in the case of magnesite and silica would render these bricks useless. Silica brick, if it goes below 91 silica, would be useless for us. I have known of cases where three different pieces of the same stone have been analysed by three different people and the analyses have been quite two per cent. different. That shows that the variation is too great and cannot be depended upon.

Q. There is no doubt that at present there are few facilities of that kind in India. I am asking you about this in order to ascertain whether it will not interfere with private enterprise if Government take up testing work in this way?—*A.* Do you think it would in the case of purely testing?

Q. We heard a good deal about it at first. If those people whose profession is to make chemical analyses and to undertake physical test could do this work, it seems all right. But you think that this is not sufficient?—*A.* It is sufficient so far but it would be a good thing if we could have men to say what sort of material was suitable and what sort not suitable. A private analyst is not in a position to know what brick will do in a furnace. We want men who have practical as well as theoretical knowledge.

Q. Surely the good name of your firm is worth more than any Government certificate?—*A.* Yes. It is more for development that I am speaking of. The resources of the country are not known so far, and there must be an enormous lot of work to be done to find out exactly what material is available; companies cannot really afford to do that.

Q. Have you tried with Mr. Fern of the Bombay School of Art?—*A.* I have never heard of him.

Q. You will have to get into touch with him because he has been testing different kinds of clay from different parts of India, that is, clays in different mixtures. He has produced very good results but they seem to be buried and nobody seems to know of his work. He may be able to give you useful information and he may be able to help you?—*A.* Thank you.

Hon'ble Pandit M. M. Malaviya.—*Q.* You say that the Indian labourer is capable of turning out just as good work as that of any other country, and you think that one pottery school in the country of a high class will suffice to impart the training that he needs?—*A.* To commence with.

Q. Where would you have it?—*A.* Preferably on a clay bed.

Q. You have no particular area in mind at present as regards its site?—*A.* I should think Ranigunge.

Q. Have you seen the Calcutta Pottery Works?—*A.* I have tried to.

Q. You say, "Drawings and oral instructions are all right after operatives have a fair knowledge of the business but practical training is the main and first consideration and absolutely necessary." Don't you think that operatives would be better able to acquire efficiency in their business if they had a previous knowledge of drawing and some oral instruction in the principles underlying the art?—*A.* I do not think it is possible to get a proper understanding without practical knowledge. My opinion is that everything must start from practical knowledge.

Sir F. H. Stewart.—*Q.* What labour do you use for the manufacture of magnesite and silica bricks?—*A.* Trained men, men whom I have trained.

Q. Drawn from the potter class?—*A.* There is really no potter class, but local men who work through the mill house as it were to the bench and they pick up knowledge as they go along from one to another and we have to teach them how to make these modern things.

President.—*Q.* Have you any supplementary remarks to make?—*A.* I should like to see Government do something in the way of giving information about silica, magnesite and fireclay. The knowledge on the subject is very scanty now. Mr. Hayden has given me some assistance.

Q. If one is to conduct practical tests in clay one must be an experienced potter because clay alone is no good, but clay mixed with various other things in different proportions and mixtures. That is exactly the kind of work that Mr. Fern is engaged in. He will be able to get from you clays which you actually use in practice and he will probably give you some advice as to mixtures that will improve your products. We cannot get the information required in any way except by co-operation between practical people like yourself, the Director of Geological Survey, who has got a general knowledge of the distribution of clays, and an independent expert like Mr. Fern?—*A.* Very well.

WITNESS No. 167.

DR. N. ANNANDALE, B.A., D.Sc., F.L.S., F.A.S.B., *Director, Zoological Survey of India.*

WRITTEN EVIDENCE.

My personal experience and official work in India have had no direct connection with industries but I think it important that evidence on the indirect bearing of pure science on commercial and industrial questions should be laid before the Commission by one who has had considerable scientific experience both in India and other countries.

Technical aid to
industries.

Under this head I desire to tender evidence suggested by my experience in corresponding with specialists in India and abroad.

Research abroad.

Q. 21.—I have had no dealings with the Imperial Institute but, before the War, carried on, as Superintendent of the zoological section of the Indian Museum, a very extensive correspondence with zoological specialists both in England and other countries outside India. In arranging for the publication of the zoological results of the Abor Expedition, for example, I had to obtain assistance from no less than 43 specialists of whom 11 resided in India, 1 in Ceylon, 13 in Great Britain, 10 in other European countries, 4 in America, 1 in Egypt, 2 in the Malay Peninsula, and 1 in Java. This correspondence was carried on in an informal manner and was most beneficial at the time. Since the War it has been very greatly reduced and indeed, except so far as Japan and America are concerned, has almost ceased.

Q. 22.—I now find this cessation of correspondence almost as beneficial as was its growth. It has given me far more leisure for the organisation of the department and for original research and has, I think, by throwing all of us on our own resources, increased our sense of responsibility, and therefore our power of doing scientific work. Our work has of course been restricted in many directions but has as it were become intensified. The publications of the museum have certainly not suffered either in bulk or in quality. Indeed, I am personally of the impression that they have improved in quality, and it is perhaps not altogether surprising that the average length, and, I hope, weight of the papers has increased noticeably.

In correspondence of the kind I have insisted on one point, that the benefit should be mutual and that if we asked for assistance in one direction we ourselves were prepared to give assistance in others. This in my opinion has done a great deal for Indian zoology.

So far as biological subjects are concerned, I am firmly convinced that the more important part of Indian work should be done in India. This view is, in my opinion, endorsed by a comparison between the monographs in the "Memoirs" of the Indian Museum and the volumes recently published in the official "Fauna of British India" published under the authority of the Secretary of State in London. To compare, for example, the monograph on the Crustacea Stomatopoda which constitutes Volume IV of the "Memoirs" with the volume on the freshwater Mollusca in the "Fauna" is to compare original scientific work with hack-work. The "Fauna of India" is edited by two gentlemen one of whom is master of a Cambridge College and a zoologist of distinction, while the other is well-known as an entomologist, and is also an official of the Imperial Bureau of Entomology. Neither of these gentlemen has had any experience of India and I am unable to find in the recent volumes edited by them evidence that they have any conception of the special needs of zoologists working in this country. The only living example of the Indian "Fauna" that most of their authors have seen are the tigers, etc., in the Zoological Gardens.

So far as purely systematic zoology is concerned, it will always be necessary to call in the aid of specialists who live widely scattered in many countries. It is not uncommon to find that there is only one specialist in the world who is able and willing to name beetles, say, of a particular family. I have not experienced any great difficulty in obtaining the aid of such specialists on the lines already indicated. As a rule we further pay the specialists who help us by permitting them to retain duplicate specimens of the collections that they work out for us. There is, or there was before the War, an entirely informal but none the less very efficient international arrangement of the kind.

The Imperial Bureau of Entomology in London was, I understand, instituted in order to further entomological work of a directly practical nature throughout the British Empire. It does very useful service by publishing abstracts of all that is published anywhere on economic entomology, as well as original papers. It also receives and deposits in the British Museum collections from working entomologists in tropical countries. Papers on parts of these collections are published from time to time, but I am not quite sure precisely what obligations the bureau accepts in the matter of naming specimens. At the time of its institution, I corresponded with Professor Maxwell-Lefroy about the assistance that the bureau could give us. We agreed that the Indian Museum in Calcutta was in at least as good a position to arrange for the naming of insects by specialists as was the bureau in London. I prefer to correspond direct with specialists, both because it obviates delay and unnecessary intervention and is, therefore, more economical, and because it encourages a spirit of co-operation and in some cases almost of personal friendship between specialists in different lines who have little or no opportunity of meeting. Further, no question can well arise as to the identity of the person responsible for the information.

Q. 28.—I have been invited to give evidence as Secretary to the Trustees and Superintendent of the Indian Museum. The latter office (or rather designation) was abolished some months ago on the inauguration of the Zoological Survey of India, but I held it, together with the secretaryship, for ten years (1906 to 1916) and continued until a few days ago to act as Secretary to the Board. My chief work has, however, been, since 1906, that of officer in charge of the zoological and anthropological (formerly the natural history) section of the museum. I held the secretaryship and superintendentship *ex-officio* and without special emoluments except free quarters. Commercial museums.

My duties as Superintendent were to maintain discipline among the servants on duty in the public parts of the museum and to supervise the museum buildings and compound. I have had no control over or right to interfere (except in cases of emergency) in the arrangement of the public galleries or in the laboratories or offices of any section except my own. I have, therefore, had no administrative experience in the industrial section of the museum, but merely that arising from long continued and close association.

The Trustees of the Indian Museum are incorporated by the Indian Museum Act of 1910 and are elected as follows:—

- (a) the six persons for the time being performing the duties of the following offices, namely:—
 - (i) the Accountant General of Bengal;
 - (ii) the Principal, Government School of Art, Calcutta;
 - (iii) the Director, Geological Survey of India;
 - (iv) the Superintendent of the zoological and anthropological section of the museum;
 - (v) the Director General of Archaeology; and
 - (vi) the officer in charge of the industrial section of the museum;
- (b) one other person to be nominated by the Governor General in Council;
- (c) three other persons to be nominated by the Lieutenant-Governor of Bengal;
- (d) one other person to be nominated by the Council of the Asiatic Society of Bengal;
- (e) one other person to be nominated by the Bengal Chamber of Commerce;
- (f) one other person to be nominated by the British Indian Association, Calcutta;
- (g) one other person to be nominated by the Syndicate of the Calcutta University; and
- (h) three other persons to be nominated by the trustees.

The present Governor of Bengal is a co-opted member and has been elected Chairman.

The Indian Museum has, since 1910, been divided into five sections, the archaeological, the art, the geological, the industrial, and the zoological and anthropological. The sections are loosely associated and the only one in which the trustees now exercise administrative control is the art section. The geological section has always been in the possession of the Director of the Geological Survey of India, while the archaeological, the industrial and the zoological and anthropological collections have been lent respectively to the Director General of Archaeology in India, the Director of the Botanical Survey of India and the Director of the Zoological Survey of India. In these sections and in the geological section the trustees now possess visiting powers in the public galleries, but they have no right to interfere in any of the offices or laboratories, except in the case of structural alterations in the buildings. The Secretary to the trustees was responsible to them for maintaining discipline in the public galleries but this arrangement was regarded as a temporary measure.

The industrial section of the Indian Museum dates from 1872 and was originally, as the Economic Museum, controlled by the Government of Bengal. In 1884, after the close of the Calcutta exhibition, arrangements were made for the transfer of the collections to the trustees of the Indian Museum. The specimens exhibited in the public galleries were at first of a very miscellaneous nature and included art objects as well as ethnological specimens. In 1910 these collections were separated into three parts, which were assigned to the zoological and anthropological, the art and the industrial sections, respectively. The Reporter on Economic Products to the Government of India, who was either a botanist or a chemist, was placed in charge of the industrial section as thus reconstituted, but shortly afterwards his post was abolished and he became Economic Botanist to the Botanical Survey of India. The Director of this Survey, therefore, assumed the position of officer in charge of the section, but the Economic Botanist remained to a large extent practically its administrative head.

As the Economic Botanist was the only expert attached to the section it has naturally become more and more exclusively a museum of economic botany. Many of the old exhibits (such as barrels supposed to contain beer), recognised by every one as worthless, have been eliminated from its galleries, while those illustrating botanical products, their uses and manufacture have been greatly increased in number and improved in quality. The foundation of the commercial museum in Calcutta has accelerated this process and I understand that the present Director of the Botanical Survey intends as soon as possible to get rid of all exhibits that are not of a botanical nature.

Under these circumstances the section has become primarily a museum for technical experts interested in vegetable products. The models of machines such as those employed in drying tea are interesting to the general public, but the real value of the galleries lies, in my opinion, in the opportunities that they afford persons interested in various classes of vegetable products to acquaint themselves with different varieties and classes of materials.

I do not think, in the circumstances, that these galleries can be made of much use to the ordinary commercial man, but this is rather a question for the commercial man himself.

With the commercial museum in Calcutta, I am acquainted merely as a member of the non-commercial public. I was consulted about the arrangements of the exhibits but not until after they had been arranged. It is perhaps unfortunate that no opportunity was, I understand, given for consultation between the officer in charge of the industrial section of the Indian Museum and the Director of the Commercial Museum before the latter was opened. In such matters it seems to me that a great deal might be effected by personal co-operation.

There is one further point in connection with commercial museums in India on which I offer my evidence, not as an expert, but merely as one who has had special opportunities recently of seeing what is being done in Japan. Every one is aware that Japan is now flooding India with goods a large proportion of which may be described as cheap and nasty. I was much struck when living last autumn in a small Japanese town in which there were no other Europeans to notice that goods of this kind were being produced almost exclusively for the foreign market and were very little used by the Japanese themselves. In the great Commercial Exhibition in Kyoto in connection with the Imperial Coronation last year goods of this kind were almost absent and the exhibits were mainly of materials such as the Japanese themselves employ in their own dresses, etc.,—materials that they have learnt to make with almost unparalleled technical excellence through the experience of a thousand years, which are probably now just as good as they were in ancient times. In the little exhibitions of local products displayed in all the more important railway stations in Japan it is also better class goods to which a prominent place is given.

One danger seems to me to be inherent in an Indian commercial museum such as that recently founded in Calcutta, *viz.*, that of producing a bad moral effect by spreading the belief in India that only inferior goods should be manufactured. I am bound to say, however, that the exhibits as at present arranged do not encourage this belief to anything like the same extent as those shown in the temporary exhibition got together at the beginning of the war.

Organisation of
technical and
scientific depart-
ments of Government.

Qs. 63-66, 69, 72, 73, 74.—I can best answer these questions together and in a general way.

I am convinced that the indirect value of pure scientific research must be recognised in technical matters, if applied science is to be developed to its full extent. It has struck me that in much recently published on matters technical the words "and scientific" are tacked on much in the same way as the phrase "whichever is the less" is used in financial regulations.

So far as pure zoological research is concerned, I can claim considerable experience. In addition to being for ten years in charge of the zoological and anthropological section of the Indian Museum, I have worked in the laboratories of one English, two Scottish and one Japanese University, in the last quite recently. I am a specialist in the systematic and geographical aspects of the fauna of Asiatic lakes, and in the course of my investigations have travelled in different parts of the Indian Empire and Ceylon, in Palestine, the Malay Peninsula, Siam, China and Japan. In the last-named country I recently made a special study of the status of zoological research.

I have not myself undertaken investigations in applied zoology, but have been in close touch with all that has been done in India in such lines for the last ten years. I make it a practice at least to glance through the current literature on all zoological subjects every week. My direct experience in technical science has been closest in reference to fisheries, for I was for a time a member of the now dormant fishery board organised by the Government of Bengal and the present Deputy Director of Fisheries, Bengal, Bihar and Orissa, has a place in my laboratory and ranks as an honorary assistant in the Indian Museum. He holds this honorary post not as a fishery expert but as an authority on certain internal parasites, but his place in the laboratory, for which the local Government pays a small annual rent, is assigned to him officially.

The scientific staff of the Zoological Survey, of which I am the first Director, consists of four scientific officers; all of whom are graduates and three of whom are doctors of science of British universities.

The great bulk of the published work of the members of the department is on taxonomic zoology, but (possibly with one exception) we regard such work as no more than a means to an end, which in our case is mainly the study of the geographical distribution of animals.

Q. 74.—The Board of Scientific Advice has in my opinion already obviated any serious danger of the overlapping of functions in the scientific departments.

In the present state of scientific organisation in India I find it necessary, for the protection of the officers of my department, to draw a line, which I recognise as entirely artificial, between pure and applied science. With the officers responsible for the latter the relation of the Zoological Survey have been defined as co-operation without subordination.

The duty of the Survey is to find out all it can, with a staff of four scientific men, about the animals of India; it is the duty of the various entomological and fishery experts under the Imperial Agricultural Department or the local Governments and Native States, to apply all zoological knowledge to the practical problems with which they have to deal.

Two main defects seem to me to exist in the organisation of science in India; firstly the small number of workers, and secondly the inferior position and—though this is perhaps less important—the small salary assigned to the junior men. In my own department, in which the chances of promotion are naturally small, the two assistant superintendents have little chance of getting more than Rs. 700 per month until towards the end of their service. Some years ago I had occasion to call at the India Office in London and to interview one of the chief permanent officials. In the course of conversation I remarked that one could not expect competent men to come to India unless they were decently paid. His reply was—I think that his words were sufficiently striking even in those days to impress themselves on my memory; “Why don’t you get Germans? They’re cheap.” In my opinion there is nothing on earth more extravagant than “cheap” science.

Paucity of scientific men in a scientific department, whether “pure” or applied, tends towards charlatanism, waste of special knowledge and bad administration; when these few men are under separate local Governments the position is rendered still worse. The few zoologists employed in India as fishery experts are all under local Governments. At present we are ignorant of many of the most fundamental facts about the food-fishes of India; we know very little indeed about their life-history, feeding habits or enemies. The fishery experts, whose training is that of zoologists, are given no time to study such matters; their duty is to supply results. They are, therefore, employed to can sardines or to arrange for the sale of fish in the market. If a food-product that tickles the palate of an administrator is produced at a great cost, a technical triumph is claimed for the department—rightly enough not for the expert, who is never head of the department. It seems to me as ridiculous to expect a fishery expert to be an expert fishmonger as it would be to expect me, who have written papers on reptiles, to charm snakes. An attempt on the snakes would probably result in damage to myself; in the other case it is the revenues of the State and the credit of science that suffer. Scientific men in the present state of affairs are often accused of being unpractical or of lack of administrative capacity. Would an official Member of Council ordered to open a butcher’s shop under a Director of Public Instruction necessarily prove an administrative success?

To show what kind of work a fishery expert* is expected to do in Bengal when he is not employed in selling fish or organizing co-operative societies of fishermen, I may quote a paragraph from bulletin no. 4 of the Department of Fisheries, Bengal, Bihar and Orissa (1914). This pamphlet is entitled “Some remarks on fishery questions in Bengal.”

“As a result of the investigations which were made during 1911 by the Superintendent of Fisheries, who had studied shad culture in America, it was thought that spawning grounds might be found near Monghyr in Bihar. Since no launch was available, no serious work could be attempted, and it was accordingly decided to establish a hatchery station at Monghyr in the hope that ripe hilsa would be obtained there. The absurdity of fixing a hatchery station anywhere, before the spawning grounds were known, and in the present state of our knowledge of the habits of this fish, was fully recognised. The experiments were only attempted because no other work on hilsa was possible without a launch. As expected the experiment failed. No ripe hilsa were caught, and consequently no fry were hatched.”

The absurdity of the experiment is duly recognised by the expert, but Government money must be wasted officially in order to grasp at results, even if it is only by placing the cart before the horse, that is to say by doing “practical” work on the basis of pure speculation. If science is to aid industrial development it must be as an investment.

I am anxious to make it quite clear that I am not criticizing the scientific officers concerned. They are in all cases junior officers of departments to which their loyal service is due. Even the conditions I have indicated have not prevented them from doing scientific work, at any rate in their spare time. So far as fisheries are concerned, there are three main items in work of the kind recently accomplished, namely Mr. Southwell’s (*Bengal, Bihar and Orissa*) papers on fish parasites, Mr. J. Hornell’s (*Madras*) account of variation in the chank shells of Southern India and Mr. Sundara Raj’s (*Madras*) notes on the freshwater fishes of the Madras municipal area. All of these investigations have been published by the Indian Museum under my own editorship. Mr. Sundara Raj’s notes were to a large extent completed while he was an assistant in the Madras Museum. I saw his manuscript before he joined the local fishery department.

Technical research in biology is, in my opinion, mere waste of time and money unless it is supported by an adequate body of men of the right type, including both practical and theoretical workers. By men of the right type I mean men who, starting with the necessary ability and character and having received an adequate training, are able under Indian conditions to do honest scientific work with a sense of proportion, without nursing grievances, without respect of persons, and without advertisement. So far as I am aware

* It is only fair to the Deputy Director of Fisheries, Bengal, to say that he has inspired no part of my evidence which has not been prepared in consultation with him.

no adequate training for such men at present exists in India and except in a few cases the official status and pay offered are insufficient to attract such men. By an adequate training I mean one that teaches a man the necessary technical manipulation, how to use the literature on his subject and, above all, to think for himself.

Even if the existing zoological departments in India were to be very greatly enlarged, such defects would not be obviated unless the officers were chosen with the greatest care and candidates were assured that having been elected as trustworthy persons, they would be trusted. It is of the highest possible importance in the selection of candidates for any scientific post in India that a man who has had practical experience of Indian conditions and has proved himself under these conditions as a scientific worker, should have at any rate a large say in the selection. I consider also that travel in uncivilized countries should be taken as an important qualification so far as biological posts are concerned.

The ideal conditions for the organization of zoology in India would be a great zoological department combining both practical and theoretical workers under a director with a wide knowledge of and sympathy with the different branches of zoology, sufficiently broad-minded not to despise any branch and not to interfere unnecessarily in the work of his junior officers. He should be given the status proper to a head of a department scientific but not minor.

To investigate any technical problem properly, the expert sent to investigate it must be given a free hand, if he is an expert at all. He must not be limited as to time, if the head of his department is satisfied that he is doing sound work. Above all, the head of his department must be a man capable of appreciating in its broader aspects the subject that is being investigated.

Reference libraries.

Q. 78.—A minor defect, comparatively speaking, in the organisation of scientific work in India is the scarcity of research libraries. So far, however, as most branches of zoology are concerned, this difficulty has been exaggerated. There are in India at least two first class zoological libraries of broad scope, that of the Zoological Survey in Calcutta and the Connemara Library in Madras. The Entomological Library at Pusa is also first class. I have no personal knowledge of the libraries of the Forest Institute at Dehra Dun or of the Madras Agricultural Institute at Coimbatore, but I understand that they are also good entomologically. I have myself made use of the libraries of five British and two Japanese universities and am convinced that we in Calcutta are better off for zoological literature than we would be anywhere else in Asia and anywhere out of London in the British Isles. No zoological investigator working in Edinburgh or Dublin can avoid visiting London occasionally to look up literature. The real difficulty in India, so far as zoological research is concerned, lies not in the absence of books, but in the great distances apart of the different cities.

Two courses might be taken to obviate this—either facilities for visiting existing central libraries might be granted to workers or new libraries might be founded in other centres. In my opinion it would be more economical to bring the workers to the libraries. A great objection to this course, however, lies in the fact that it would prevent the majority of Indian students under training from acquiring any real knowledge of how to use literature in research. I am inclined to think that the lack of literature is at present a more serious matter to the students than to their professors or to the experts employed as such under Government. I have recently visited practically all the colleges in India in which zoological investigations are being undertaken and so far as I have been able to discover most of the professors have had no great difficulty in obtaining the special volumes they need for their own investigations. The students, however, have no experience in looking up references and no appreciation of how to use the references brought directly to their notice.

ORAL EVIDENCE, 4TH JANUARY 1917.

President.—Q. I understand that your position recently has been changed from that of Superintendent of the natural history section of the museum to Director of the Zoological Survey of India, the work of the museum being retained as before. I understand that the actual work being done by you and your colleagues is just the same to-day, but that you have a certain amount of greater freedom as head of the Imperial department. What officers have you got working with you?—A. I have one Superintendent and two Assistant Superintendents.

Q. So you are four altogether?—A. Yes.

Q. And what relation then do you bear to local zoologists like those engaged in teaching, in charge of the local museum, and the zoologists connected with the Fishery Department?—A. A certain number of the zoologists are honorary assistants in the museum, *i.e.*, there has been no change made as yet. I presume later they will be connected with the Zoological Survey of India in the same way, but I have no administrative connection whatsoever with any of the local men.

Q. I understand that the policy that you have accepted for the department as it now stands might be roughly regarded as the purely scientific aspect of zoology drawing the lines where the results begin to touch on practical and economic problems which you leave to these local officers?—A. Yes.

Q. You know there are several ways of classifying natural functions ; one likes to find out generally the best for working under Indian conditions. You say that the " ideal conditions for the organization of zoology in India would be a great zoological department combining both practical and theoretical workers under a director with a wide knowledge of and sympathy with the different branches of zoology, sufficiently broad minded not to despise any branch and not to interfere unnecessarily in the work of his junior officers. He should be given the status proper to a head of a department, scientific but not minor." Then you refer to the case of an expert being deputed or appointed to investigate any technical problem locally. Presumably an expert of that kind, if employed by the local Government, would be under non-expert supervision and the local Government therefore would be dependent entirely on his views without check by any senior officer of similar qualifications. Don't you think that is likely to lead to a difficult position ?—A. I don't think so. I don't think I have touched upon that point at all, so far as I remember. My idea would be that the officer, as regards administration, would have to be to some extent under the local Government, in the district or province in which he was working. When he went to the district or province, his first duty would be to make preliminary investigations and see what could be done in the particular subject. He would then make a report, on general lines, to the Director of his department directly, and the Director of the department would submit this report to the local Government with any recommendation he thought desirable, and that finally would be considered by the local Government in consultation with the Director. Once a programme had been accepted both by the Director and the local Government, the man should be given an absolutely free hand. Say once a year, or once in six months, or once a month, just as the magnitude of the investigation indicated, he should submit a report to the Director of the department, who would then advise the local Government at once whether he considered it was desirable to carry the matter further and if so whether any change in the ordinary programme was necessary.

Q. That is so far as concerns the deputation of officers in your department to assist the local Government in investigations, but there are eleven local Governments and there are only four of you, so that that is not going to work very efficiently in practice ?—A. I have said so. I refer to ideal conditions, not to the present conditions.

Q. Take the case of the specialist, the zoologist, who is actually employed by the local Government and who is not a member of your department. He may be a fishery expert ; he may be alone or one of two ; that is the best we have ever seen in India yet. How is the local Government to appreciate that man's work when he is a good man, and how is the local Government to deal with that man when he is so otherwise ?—A. I don't know ; there is no organization at present to allow anything of the kind.

Q. Would it not be better to allow all these zoological officers to be members of the Zoological Survey ?—A. Yes. They might be attached to the Zoological Survey.

Q. Are you then of opinion that these officers ought to be linked together into a larger Imperial Department ?—A. Yes. I think so, certainly.

Q. That is what you mean when you refer to " ideal conditions " ?—A. Yes. I think that at present there would be very great personal difficulty, because naturally each officer would consider that he should be above the officer in the same office attached to a small local Government, but we should not pay any serious consideration to that. I don't think that any personal question of the kind would result in permanent disorganization of the work in India, but it would need great tact to organize the department.

Q. Take the case of the fisheries ; in matters of fishery activities you have problems that can be divided into two groups ; first the scientific habits of the fishes must be ascertained as the foundation for any kind of practical work ; secondly there is the practical work consisting of the formation of co-operative societies among fishermen, methods of improving their means of catching, development of the market, and, generally, questions that a zoologist ordinarily is not an expert at. Ordinarily a fishery expert would not be able to deal with both the scientific and commercial sides of fishery questions himself. If there were two of them, then the difficulty would arise as to who was to be " boss," and in a case of that kind there is likely to be friction. Would it not be better if all these scientific fishery experts were members of your department, leaving for further consideration the question whether the others should be under the local Government or under the Government of India ?—A. That would lead to very considerable difficulties in practice, because it would almost inevitably bring about a situation of this kind,—the practical man would be practical on his own lines without consulting the scientific man at all, whereas the scientific man's work would be inclined to be entirely scientific without any reference whatsoever to the particular practical problems he was employed in working out.

Q. That would be the same if he was a member of the Imperial Government or employed by the local Government. In the case of his being employed by the Imperial Government he would be able to bring to the notice of his department the whole question. This rather increases the argument that the scientific member should be a member of the Imperial department ?—A. Certainly. The difficulty is that in all scientific matters in India I have found lack of co-operation, and of course if you are having an Imperial department for the more scientific aspects of the technical work, there would have to be some corresponding department in the instance you give for the purely technical side.

Q. Supposing you had a superintendent of fisheries who was not necessarily a zoologist; would it not then be easier for you to lend an officer to assist him in the zoological aspects of his work; would you not be in a position to tell the local Government with some authority the importance of considering the habits and tricks of fishes before you begin to talk about organized methods of fishing?—A. I think it would in one way, but my point is this—that if you have an Imperial scientific department corresponding with a number of local practical men, there is much more likelihood of friction than if you had two Imperial departments, one dealing with the technical application of science and the other with the more purely scientific aspects of the question.

Q. The question of the application of science always involves a certain number of local problems more so than the purely scientific aspects of the problem?—A. I don't think that applies so much to zoology as to other sciences.

Q. It does apply to fishing. The conditions of Madras are certainly different to those of Bengal?—A. But not entirely different as long as the fisheries are combined with those of Bihar and Orissa.

Q. You can also get a case in which a fishing problem could not be studied within one local Government alone; so the officer who is employed by one local Government might find the best solution of his problems within the area of another province. In that case it would be more convenient for him to be a member of the Imperial department so as to have access to two provinces?—A. Exactly, but my point is, the scientific officer should certainly be a member of an Imperial department but the technical officer, in consultation with whom he had to work, should also be an officer of an Imperial department. In the case you instance, I remember there was a question some years ago of investigating the breeding habits of the hilsa and the hilsa did not restrict its habits to a certain province. It was believed that the hilsa went up beyond the limits of Bengal to breed and very great difficulty arose in allowing the officer who was investigating the question to go beyond Buxar. As a matter of fact there was only one fishery expert, so that the difficulty only applied to him; but supposing that a local technical officer had been working in consultation with him, would not the local technical officer have ceased to consult with him when he got beyond the limits of Bengal?

Q. He would have to consult two types of local technical officers?—A. Yes. Take fishery problems again. You have estuarine, marine and fresh water problems to consider in Bengal and Bihar and Orissa, and these are three different sets of problems. What would be true of all these three types combined would apply to the whole of India from the technical point just as much as from the scientific point.

Q. Have you got any possible hope within you of making any kind of impression on the zoological survey of India with four officers?—A. No, I regard the foundation of the new department purely as an opportunity for development.

Q. What, to your knowledge, has been done in India towards training young Indians to take up a work of this kind?—A. Very little. In Bengal nothing. In Lahore there are a certain number of Indian students of zoology who are receiving a good ordinary zoological training. So far as I know they are not being encouraged in any way to apply this training to practical results. At Pusa I understand that students are given some training for practising entomology. The difficulty there is that men cannot be found who have got a preliminary training in pure zoology. In Madras there is a certain amount of pure zoological training given and there they are perhaps more successful in getting men who will apply this work to fishery problems. In Allahabad there is a zoological school which, as far as I know, is becoming morphological. That is a fair statement of what is being done in zoological training in India. In Calcutta the only zoological training is that given to medical students. It is impossible for anyone who is not a medical student to get a zoological training.

Q. At present I suppose there are very few openings in sight for young Indians?—A. Not immediately in sight, but everybody realises that, especially in entomology and fisheries, there must be openings in the future before very long.

Q. Take the question of entomology separately. Is it correct to assume that entomological work is so bulky as to constitute a branch of its own and of a kind that barely trespasses on other parts of zoology?—A. I would not like to say that. I think it is very essential that a sound entomologist should have a sound general zoological training. Some years ago when we were appointing an extra staff for what is now the Zoological Survey of India, I think it was definitely laid down that we were not to try to get a man for the entomological section who already was an expert entomologist, but a man who had a good general training in zoology, and then send him afterwards to Ceylon, where the best entomologist in this part of the tropics was then stationed, to get a special training in entomological work. We found that worked far more satisfactorily. The difficulty about entomological experts is that the great majority of them specialise very early and become experts in one family of insects only. They have very little knowledge of the general principles which underlie the science.

Q. I suppose zoology to an entomologist is like mathematics to the physicist?—A. I do not know that I would agree to that so far as the study of habits is concerned. The study of habits is more important than purely systematic work and needs a broad outlook. It should

not be laid down that a man who studies the habits of moths, for instance, should not study the habits of beetles, because there are very broad general principles underlying both, and specialization would be harmful as much from the scientific as from the practical point of view.

Q. Why don't we find in this country people taking zoology like we find in other parts of the world? We have philological students in great numbers without any greater prospects from the worldly point of view than in the case of zoology?—*A.* I think it is this; in the old days in India I believe it was the custom for the man who had retired from daily life to retire to the jungle, whereas we find in a very large proportion of boys in European countries, especially in Great Britain, that their tendency is to go in to the woods when they are young and study animal life. In India it is almost unheard of to discover young boys who collect butterflies, or who are interested in plants and flowers, and no encouragement is given in the schools for the study of nature. There is no conception in the home life that any such things could be of interest at all, and therefore if scientific training is to be more successful in India it must be begun very much earlier.

Q. You want more natural history studied in school?—*A.* I don't think schools are enough. You want to get boys to take some interest in such things out of school hours.

Q. Are you of opinion that collections could be kept safely in this country as well as in London?—*A.* I think they can in Calcutta. Calcutta is peculiarly favourably situated for the preservation of organic matter, for this reason, that we have nothing very extreme in climate. I have talked over the question with private gentlemen who have collections of butterflies and they tell me that in Simla and Delhi, where you get extremes of moisture and temperature they find it impossible to keep their collections as we do in Calcutta. They get extremely brittle in dry weather and are likely to fall to pieces in wet weather.

Q. You don't think any advantage is to be gained in sending types for preservation to London?—*A.* None whatever, always provided that in India, there is a sufficient subordinate staff to look after specimens. In the Indian Museum, we have six men whose whole duty it is to go through the collections and see that the spirit does not dry up in the bottles, and that the insect cases are provided with antiseptics. Our old collections in Calcutta are in a very bad condition. That is entirely due to inevitable neglect, because there was formerly no staff to look after them.

Q. If your staff is increased do you think you could undertake the work of zoological teaching in connection with university colleges?—*A.* No, I don't think we could unless it was increased beyond all probability. In any increase we are likely to get, the difficulty would be in getting men who are real teachers.

Hon'ble Pandit M. M. Malaviya.—*Q.* You speak of an industrial section of the museum, and later on you speak of the commercial museum. Would you suggest that the two should be located in one and the same building?—*A.* No, I do not think it is necessary. I think they are catering at present for two entirely different classes of men, and the fact that the commercial museum was situated in a museum like the Indian Museum would perhaps rather tend to frighten commercial men away. It is better not to have them in the same building.

Q. If it was to be placed where information could be had of raw materials obtainable for different manufactures?—*A.* If it were to be that, I certainly think a commercial museum should be combined with the industrial section, provided it was placed where you could inquire about raw products. Of course at present the industrial section of the museum is becoming entirely botanical. The only reason is that there happens to be a botanist in charge, and no other expert available.

Q. You say that in Japan you noticed that goods of inferior kind would be produced almost exclusively for the foreign market, and you say that the goods they themselves use are superior in quality?—*A.* Yes.

Q. Are they produced in the same factory?—*A.* I think not. That is a point I cannot give precise information about, but I think not.

Q. Did you find these little exhibitions of local products at a very large number of railway stations?—In every large railway station; just a few cases in a prominent place with information as to the price and place. The information on the labels was entirely in Japanese but I understand that there was a statement as to the prices.

Q. Did you enquire of the conditions under which this was done?—*A.* No.

Q. Is any particular man in charge of these little exhibitions?—*A.* I cannot tell you that. It is extremely difficult in Japan to find out who is in charge of anything. Everything is done by committees.

Q. You have got four scientific officers who are all graduates; are any of these Indians?—*A.* One is.

Q. Where did he graduate?—*A.* Calcutta first, and Edinburgh afterwards.

Q. With reference to the last paragraph of your note would you recommend at least one library in every province?—*A.* Yes, I think so; every province or group of provinces. The question was recently discussed by a committee of the Board of Scientific Advice and we decided to recommend to Government that there should be one research library in each group of provinces.

President.—*Q.* Is that committee still at work?—*A.* Yes, its report is being considered.

Sir D. J. Tata.—*Q.* With reference to those commercial exhibitions in Japan do I understand that at these exhibitions only the superior kinds of goods which the Japanese themselves use are exhibited?—*A.* Practically, yes.

Q. The things they dump on foreign markets are not exhibited at all?—*A.* No. For example, Japanese have a great dislike for cheese; they cannot stand the smell of it, but they make cheese in large quantities for export.

Mr. A. Chatterton.—*Q.* You refer to the absence of any interest on the part of children in zoological collections. I suppose that is very largely due to the fact that in their early training they are taught that it is a sinful act to take life in any form?—*A.* I don't think that has very much to do with it, because what I say applies just as much to plants and natural phenomena generally as it does to animals. It may have something to do with it, but I don't think that it is really fundamentally at the bottom of it.

Q. Would it be possible to draw up a course of training in elementary schools, in botany, which would tend to cultivate their powers of observation?—*A.* Suitable teachers cannot be obtained. What I would like to see done is that there should be an educational section of the Indian Museum and in charge of this section there should be a man who would act as secretary to the trustees, a scientific man really keen on teaching. It is more difficult to get a man keen on teaching than a really scientific man. He should arrange for popular lectures and demonstrations. He should not only conduct school boys round the museum but should take them out on the maidan and demonstrate things living.

Q. I understand that something of that kind has been done by Dr. Henderson lately in the museum in Madras and that it has not proved very successful?—*A.* I don't think he regards it as a failure. I don't think he has been conducting people outside the museum. I know he has been conducting school boys and possibly girls round the galleries. He considers it rather an important movement, but not one from which one would expect immediate results.

Q. It would be possible to arrange courses, if you got suitable teachers, which would tend to cultivate their powers of observation to a greater extent than it has done up to now?—*A.* Certainly, but I don't think it would be the slightest good to start "nature study" classes, in which the nature taught was anything but natural.

Dr. E. Hopkinson.—*Q.* Supposing it is determined that primary education in India shall be directed towards developing the observational faculties of the children, what steps would you take to provide teachers capable of giving suitable instruction?—*A.* That of course is very difficult, because you would need teachers who are really interested in the subject themselves and that is just what one cannot get in India.

Q. You think that they cannot be got?—*A.* I have been making rather elaborate enquiries as to the students of zoology in India, and I have certainly failed to find them in anything like large numbers. There are a very few. I don't believe there are more than half a dozen Indians at present who are really interested in zoology of any kind.

Q. Then you consider that, before any progress can be made in that direction, it would be necessary to take steps to ensure suitable teachers?—*A.* Yes.

Q. That is a rather hopeless problem?—*A.* Not absolutely, but it means that you will have to get really first class men from Europe who would be so enthusiastic themselves, and teachers of such calibre, that they would encourage interest in natural history generally among young children and train them up in the way that they should go. Of course it would be a very, very slow process.

Q. You would not suggest that men brought from England should teach in village and man schools. You mean that they should have training classes?—*A.* Yes, and I would like to see a man attached to the Indian Museum in Calcutta whose duty would be to arouse an interest in natural history. Primarily it would have to be among small children, because it would be very difficult to get material which you could build upon in the case of teachers.

Q. That would have a very limited effect; it might influence the minds of a few hundred children?—*A.* Exactly, but that is all one could hope for at present. These would influence a few hundred more.

President.—*Q.* If the museum were in the zoological gardens would it then become a source of zoological information?—*A.* I don't think so.

Hon'ble Pandit M. M. Malaviya.—*Q.* Is zoology a part of the elementary course in England?—*A.* No.

Q. Do you know of any country in which it is?—*A.* Not the elementary course. I believe a great deal has been done in England and especially in America during the last few years in encouraging nature studies but exactly what place it takes in the ordinary school course I cannot tell you.

Q. We are familiar with nature studies in the ordinary way, but I want to know if regular instruction in zoology is given and whether it is part of the elementary course anywhere?—*A.* Possible it is in Japan. I was shown elementary text books for boys of seven years of age.

Q. It is one thing to have an elementary text book but my question is, is it part of the elementary course?—*A.* I think it is in Japan, but not in England.

WITNESS No. 168.

Mr. T. SOUTHWELL, A.R.C.S., F.Z.S., *Deputy Director of Fisheries, Bengal and Bihar and Orissa.*

WRITTEN EVIDENCE.

A short history of fishery enquiries in Bengal.

The beginning of fishery enquiries in India may be said to date back to the year 1867, when Sir Arthur Cotton (who was perhaps best known as an authority on the subject of irrigation in India) remarked, in a communication to the Secretary of State for India, that "he supposed that the injury to the coastal fisheries must be very great, since seven of the principal rivers on the East coast had been barred" by the then newly-constructed irrigation works. During the same year the Government of India initiated enquiries relative to the fisheries generally.

In 1868, the Secretary to the natural history section to the Asiatic Society of Bengal, in answer to an enquiry, replied "that the Council are fully aware of the great importance of the question at issue and they consider that the statement made by Sir Arthur Cotton, together with strong *a priori* arguments that may be adduced, render it in the highest degree probable that the effects of anicuts or weirs across large rivers lead to a rapid destruction of many kinds of fish, which may ultimately lead to their extermination, not only by interfering with their spawning in accustomed localities, but by leading to their accumulating in large numbers below weirs, where they are not only captured in large quantities by man but are exposed in an increased degree to the attacks of crocodiles and predacious fishes."

As a result, the Government of India, in 1868, appointed Surgeon Major Francis Day to investigate the question of the anicuts or weirs in the Madras Presidency. The enquiry was subsequently generalised and extended to Orissa and Lower Bengal, and afterwards to British Burma and the Andaman Islands. In the year 1871 the enquiries were further extended by Dr. Day into the North-Western Provinces and the Punjab, and finally into Sind. The excellent work done by the late Dr. Day was of a very extensive nature, and it marked a new era in the history of fishery investigation in this country. Had the investigations of Dr. Day been continued, and had the various recommendations which were elaborated by this officer as a result of the researches of a lifetime been given effect to, there can be no room for doubt that a very great and marked improvement in the fisheries of India, and of Bengal in particular would have resulted. Unfortunately, after the death of Dr. Day in the year 1889, the enquiries ceased, and so far as the Provinces of Bengal and Bihar and Orissa are concerned, no further work was done on the fisheries until the year 1906.

During this interval, however, considerable additions to our knowledge of the deep-sea fishes in the Bay of Bengal were made by Colonel Alcock, I.M.S., Surgeon Naturalist to the Indian Marine Survey, and, later, Superintendent of the Indian Museum. Extensive enquiries into the coastal and estuarine fisheries were also carried on by this officer, and in a short special report which he submitted respecting these fisheries he very strongly advocated their exploitation on commercial lines.

On 26th July 1906, Mr. K. G. Gupta, C.S.I., I.C.S. (now Sir K. G. Gupta), a Senior Member of the Board of Revenue, Bengal, was placed on special duty by the Government of Bengal, in order to enquire into the fisheries of this province, and its fish-supply. This enquiry was taken up in July 1906, and his report thereon was submitted to Government on the 20th of February 1907. In May 1907, Sir K. G. Gupta proceeded to America and conducted enquiries into the fisheries of the United States and Canada. Later on, he visited various centres on the Continent, and finally he conducted investigations at many of the principal fishing centres in the British Isles. His report on the above fisheries was placed before Government on the 27th of January 1908, and the two reports were subsequently published together by the Bengal Secretariat Press, Calcutta, in the same year, under the title, "Reports on the results of enquiry into the fisheries of Bengal and into fishery matters in Europe and America." In his report Sir K. G. Gupta set forth a mass of useful information with reference to the physical features of the province, the castes engaged in fishing, the great variety of nets and other fishing instruments in use. Certain details were also given relative to the consumption of fish, and the carriage of fish within the province. Methods of utilising waste products and of improving local methods of curing fish were indicated. The question of the general fish-supply, the cause of its decrease, and the possibility of adopting protective measures were also dealt with. Improvements in tank culture and in transport were also discussed. Finally he advocated the immediate establishment of a Fishery Department in Bengal, which should be combined with the Department of Agriculture, and he further advocated the formation of a Fishery Board for the control of the fisheries.

Two important results followed this enquiry :—

- (1) The recommendation made by Sir K. G. Gupta that a survey should be made of the fishery possibilities in the Bay of Bengal, was immediately acted upon by Government, and very shortly afterwards a typical steam trawler was actually at work in the bay.
- (2) The present Fishery Department owes its origin to the recommendations made in the reports referred to.

The enquiry by Sir K. G. Gupta terminated on January 27th, 1908.

From February 18th, 1908, Mr. A. Ahmed, as Commissioner of Fisheries, continued the work which had been begun by Sir K. G. Gupta.

On October 23rd, 1908, Government formally sanctioned the constitution of a Fishery Board, and also defined its functions. This Board consisted both of official and non-official members, and included a representative from each of the seven divisions of Bengal, the Bengal Chamber of Commerce, the National Chamber of Commerce, the Commissioners of the Port of Calcutta, the British Indian Association, and the Bihar Land Owners' Association. The Board met five times during the period in which Mr. Ahmed was Commissioner.

We have already noted that, as a result of the representations made by Sir K. G. Gupta, a steam trawler was obtained, by Government, without loss of time, and within six months was at work in the bay. This trawler, the "Golden Crown," started on her first trip on June 13th, 1908, and completed her last voyage on December 17th, 1909. The investigations made by the "Golden Crown" in the Bay of Bengal, and by the steam launch "Ila" in the Sunderbans, were carried out by Dr. J. Travis Jenkins of the Lancashire Sea Fisheries, whose services had been specially engaged by the Government of Bengal. The primary object of the investigations in the Bay of Bengal was not to supply the market with fish, or merely to attempt to prove that trawling operations in the bay could be made commercially successful, but to locate and chart the principal fishing grounds, to ascertain what kinds and quantities of fish were obtainable and where they were to be found at particular seasons, etc. The results obtained by Dr. Jenkins are of great importance. He showed that trawling could be carried on successfully right through the monsoon. He also located some of the best fishing grounds and prepared a chart shewing the area which had been trawled over, and the nature of the bottom. He further proved that sea fish could be landed in a fresh condition in Calcutta from places as distant as Akyab and Santapillai.

In connection with the estuarine fisheries Dr. Jenkins made three trips to the Sunderbans, in the steam launch "Ila", on the following dates :—August 20th to 30th ; November 10th to 21st ; and December 5th to 16th.

The launch was quite unsuitable for fishery enquiries ; and only 30 days were actually spent on the investigation although the area covered by these fisheries is over 5,700 square miles. The only equipment he had was a shrimp trawl, a few mackerel nets, and several herring nets. On the last trip the launch also carried a fish trawl provided with traps and pockets. These nets, like the boat, ultimately proved unsuitable. In spite of these serious difficulties, however, Dr. Jenkins obtained several interesting and important results.

II.—A comparison of the Fishery Department with other Fishery Departments in India and elsewhere.

The Fishery Department of Bengal and Bihar and Orissa conducts operations over the two provinces named above. In each province the Director of Agriculture has supreme control over the fisheries. Under the two Directors of Agriculture there is one Deputy Director of Fisheries, and two Superintendents of Fisheries, all of whom are gazetted officers. Lastly, there is a temporary zoological student who is learning the work.

At the invitation of the India Office I accepted the appointment of Deputy Director of Fisheries (for Bengal only) on the 5th December 1911. As a result of the administrative changes which took place in 1912, the department extended its operations over the new province of Bihar and Orissa, and over Eastern Bengal.

One Superintendent of Fisheries took a B. A. in physics in Calcutta University in 1900 and graduated as M. A. in 1903, taking light and acoustics as principal subjects. He continued research work in physics at Sibpur College, Calcutta, during 1904, and in 1907 was appointed demonstrator in physical science in the Presidency College, Calcutta. In May 1908, he was selected by Government to visit Europe for the purpose of studying carp-culture and fish-curing. He returned to India in October 1909, and immediately joined the Fishery Department being confirmed in that appointment at the expiration of the short period of three months. The other Superintendent of Fisheries was a student in Calcutta University, but failed to take his B. A. degree. In August 1908 he was appointed by Government to visit America in order to study *Shad* culture. He returned in November 1909 and at once joined the Fishery Department. In October 1910 he was confirmed in his appointment. It is decidedly unfortunate that neither of these officers had the advantage of any training in zoology or natural history either before, or since their appointment, as this fact had precluded the possibility of their taking a more intelligent and responsible part in the fishery enquiry in Bengal.

Such is the history and composition of the present Fishery Department. The area over which the department conducts operations and enquiries, together with the population according to the census of 1911, are summarised in the following table :—

Locality.	No. of Districts.	Area in square miles.	Population.
Bengal	27	84,092	46,305,642
Bihar and Orissa	21	111,829	38,435,293
Total	48	195,921	84,740,935

In the British Isles, fishery enquiries are conducted by the different bodies indicated below :—

- (1) *Fisheries Branch of the Department of Agriculture and Technical Instruction.*—This is in charge of a Chief Inspector, supported by two Inspectors, together with 3 or 4 temporary scientific assistants, all of whom are trained zoologists.
- (2) *Fishery Board for Scotland.*—Under this Board there is a scientific Superintendent, an Inspector of Salmon Fisheries and two Inspectors of Sea Fisheries, all of whom are trained zoologists. In addition, there are about 32 Fishery officers who have no special zoological training.
- (3) In England, the Fishery Division of the Board of Agriculture is in charge of an Assistant Secretary who is subordinate to the President of the Board of Agriculture. The expert staff is as follows :—
 - (a) Inspector of Fisheries.
 - (b) A Sub-Inspector.
 - (c) A temporary Inspector. All of whom are trained zoologists.

In addition, there are about 160 Collectors and Assistants engaged in subsidiary operations.

- (4) *Plymouth Marine Biological Association.*—The permanent staff consists of a Director, a Naturalist for Fishery Investigations, and an Assistant Naturalist—all trained men. During the International Fishery Investigation in which the Association took part, the expert staff was as follows :—

The Director, stationed at Plymouth.

The Chief Naturalist, stationed at Lowestoft.

The Assistant Naturalist for fishes, stationed at Lowestoft.

The 1st Assistant Naturalist for invertebrates, stationed at Lowestoft.

The 2nd Assistant Naturalist, stationed at Lowestoft.

The Statistical Assistant, stationed at Lowestoft.

The Hydrographer, stationed at Plymouth.

The Assistant Naturalist for Plankton, stationed at Plymouth.

- (5) *The Lancashire and Western Sea Fisheries Committee.*

The expert staff is as follows :—

Professor Herdman, F.R.S., Director.

Dr. Johnstone, in Liverpool.

Mr. Andrew Scott, at the Piel Marine Laboratory.

Dr. J. Travis Jenkins, Superintendent of Fisheries.

There is also one temporary Assistant (a trained zoologist) with Professor Herdman.

- (6) *The Northumberland Sea Fisheries Committee—*

Director, Professor Meek, and two Fishery officers.

Besides the above, the following public bodies (amongst others) are engaged in fishery enquiries and administration :—

The Sussex Sea Fisheries Committee.

The Kent and Essex Sea Fisheries Committee.

The Suffolk and Essex Board of Conservators.

The Devon Sea Fisheries Committee.

The Eastern Sea Fisheries Committee.

The South-Eastern Sea Fisheries Committee.

The Severn Board of Conservators.

These bodies, for the most part, employ local officers. A remarkable feature of the work carried on by many of these Fishery Committees is the extent to which their operations are dependent on the munificence of private individuals. They also receive small grants from Government and are further assisted by local taxes.

In the Madras Presidency the fishery staff consists of an honorary Director who is a member of the Indian Civil Service (retired), a Superintendent of Pearl and Chank Fisheries who is a trained zoologist, and fresh-water fishery expert who has had a long experience in the artificial cultivation of fresh-water fishes. In addition, there are a large number of Indian assistants.

In the Punjab, the fisheries are in charge of a Warden who is assisted by a few Indians. A Fishery Department has just been initiated in Travancore. It is controlled by the Director of Agriculture. As far as I am aware there are no other Fishery Departments in India.

The following table indicates the approximate amounts spent by different countries on fishery work :—

India—	£	Year.
(a) Bengal, and Bihar and Orissa	4,000	1915-16
(b) Madras	15,917	1915-16
United Kingdom	86,000	1908
Norway	20,000	1908
Sweden	9,970	1908
Denmark	16,555	1908
Holland	15,170	1908
Belgium	920	1908
Canada	200,000	1908
Germany	27,750	1908
United States of America	140,879	1908

I have thought it necessary to detail the preceding particulars in order that the relation of the department to the work before it might be understood.

III.—*Present condition of the fisheries in Bengal.*

It is not possible in a short written statement of this kind to set forth fully and accurately the various problems facing the department, nor the manner in which the work is being attempted, but a brief consideration of the following points may help to elucidate the situation.

It is necessary in the first place to understand clearly that, so far as the Indian population is concerned, fish is an article of food second in importance only to rice. It is believed that at least 80 per cent. of the entire population in Bengal consume fish regularly. In certain parts of Bihar and Orissa where wheat, maize and other grains are preferred to rice, meat is consumed in place of fish.

Secondly, it is unfortunate that in Bengal the occupation of fishing or dealing in fish is regarded as a business to be carried on exclusively by the lower classes. The whole industry is thus left in the hands of people with no capital, no education, and no business capacity.

The price of fish is undoubtedly high at certain seasons but, it will be remembered that most commodities have increased in price during the last 20 years. Fish has apparently shared in this general increase. Apart from this fact, it may be true that a shortage of fish has also tended to enhance prices. It is, however, an established fact that the current high prices are due largely to the operations of middle-men. The Bengal fishermen are of course, not the only fishermen who are subject to exploitation, but in the principal fishing centres in Bengal, the process is carried on so thoroughly that the fishermen are reduced to such a degree of poverty that they are unable to purchase nets and boats to continue their occupation. Many have accordingly taken to agricultural pursuits.

The irregular supplies of fish in the market are due to two main causes :—

- (a) Seasonal distribution of fish. For this there is no remedy.
- (b) The fishermen do not work regularly even when weather conditions permit. Although poor, and subsisting on the mere necessities of life, the success of one day leaves the fisherman free to indulge in idleness the next. In this respect the Bengal fishermen stand in marked contrast to fishermen in western countries.

It is commonly believed that there is a growing scarcity of fish. In the absence of statistics it is difficult if not impossible to say to what extent this is true. Having regard to the manner in which fishing operations have been conducted in this province during the last 100 years, it would be astonishing if the supply kept pace with the demand. The late Sir Francis Day stated "that British rule appears to have had a most disastrous effect upon the fresh-water fisheries of the Indian Empire." His opinion was based on the belief that under native rule indiscriminate fishing was generally not allowed. "If persons may help themselves as they please, they will take those (fish) captured with the least trouble and thus breeding fish and fry are destroyed where they should be preserved. The people cannot be blamed for this; fishermen will do it whether in Europe or India if so permitted."

Fishery rights.—The following facts appear to obtain with reference to the fishery rights in general :—

I. The fisheries of the open sea (*i.e.*, those situated beyond the three miles limit) are, of course, open to be exploited by any one.

II. At present, Government apparently prefers not to exercise control with reference to fisheries situated within the three miles limit. The foreshore fisheries at Balasore, over a length of about 15 miles are, however, administered by the Ordnance Department, and a further adjoining portion is, I believe, privately owned.

The foreshore fisheries in the vicinity of Dhamra belong to the Raja of Kanika. As far as I am aware, no steps have been taken by Government to control the remaining foreshore fisheries.

III. In tidal waters, the fishery rights belong to the public, Government being the public trustee.

In a very few instances, Government has leased out small portions of these fisheries. In other instances, Government has waived its claim to the fisheries. In the great majority of cases, however, proprietary rights are claimed, apparently as a result of the entire lack of administration over long periods of time.

Perhaps in some cases this circumstance has arisen owing to water-ways having changed their course, and commenced and continued to flow over permanently-settled estates.

Possibly in other cases the fisheries have been permanently settled, although no such case has come under my notice except perhaps the fisheries in the district of Jessore. In still other cases Government has apparently failed to protect the public right in allowing the fisheries to be gradually appropriated by private individuals. The result is that, whereas the fishery rights in tidal waters should belong to the public, they have, in large measure, become privately owned. Not only has a large potential revenue been lost to Government in this way, but the fisherman has lost his right to fish, for, where prescriptive rights are claimed, the fisherman has to pay rent.

The fishery rights in the main rivers are owned partly by Government and are partly settled permanently. In some districts, portions of Government fisheries are, for some reason or other, not farmed. In other cases, no one appears to know whether the rights belong to Government or not.

The question is a very difficult one. Under the circumstances it is only possible, at present, for the department to deal effectively with fisheries directly under Government control. Such fisheries are leased out to the highest bidder, by the Collector of the district in which they are situated.

Fishery regulations.—Bengal Act II of 1882 relates to laws regarding embankments and watercourses and is of no direct importance so far as the fisheries are concerned. Act IV of 1897 applies to the whole of India except Burma. This Act merely prohibits the dynamiting and poisoning of waters in order to kill fish. It further empowers local Governments, under certain conditions, to frame rules with reference to the following points:—

- (a) The erection and use of fixed engines.
- (b) The construction of weirs.
- (c) Kinds of nets to be used and the methods of using them.
- (d) Prohibiting all fishing in any specified water area for a period which may not exceed two years.

Up to the present, no rules have been framed under this Act either in Bengal or Bihar and Orissa.

It will be observed that this Act does not provide for close seasons for any species of fish, nor are any regulations laid down designed to prevent the indiscriminate capture and sale of fry or brood fish.

The entire absence of fishery regulations over long periods of time has undoubtedly had a deleterious effect on the fisheries. At the same time it will be obvious that specific regulations could not be adopted until their nature had been determined by scientific investigations. General measures could, however, have been initiated. No particular scientific knowledge is required to understand that the capture and sale of breeding fish, and fry, the ruthless methods of fishing in vogue, etc., have been, and continue to be, extremely harmful.

Last year, Government passed orders that Collectors shall consult the Fishery Department before settling fisheries. This has enabled us to initiate such protective measures as are indicated in the particular cases examined. Up to the present, owing to the restricted area covered by such fisheries, supervision has not been very difficult. That it will become so, is, I think, certain. The necessity of extending regulations, and perfecting them, so as to include all fisheries, will then occur, and steps will have to be taken to provide the machinery to enforce them. The Fishery Department, as at present constituted, could not possibly exercise control over the whole province, and if the improvements indicated have to be effected, the staff will of necessity have to be increased, unless the supervision can be undertaken by some other department.

Irrigation schemes.—Established irrigation works have reacted disastrously on the fisheries and the development of agriculture has, in a measure, taken place at the expense of fisheries. I need not perhaps explain fully the exact manner in which this has been brought about, but the following points may be noted:—

(I) *Weirs or anicuts*—

- (a) In the river Mahanadi. Here, the eggs and fry of fish, from the higher reaches of the river, are carried over the weir, probably before they are capable of any appreciable movement. Once over the anicut it is extremely difficult for the fish to return. The higher reaches of the river are thus being drained. Below the anicut, tidal water occurs within 60 miles. It is true that fish-ladders exist in this river (and in the Sone), but no fish-pass or passes can materially lessen the ill effects of the weir.

- (b) In the Sone, the fry, passing over the weir, have a reasonable chance of reaching the Ganges, the tendency here being to deplete the Sone fisheries.
- (c) In the Cossye, the fry or eggs passing over the weir find themselves in an area which dries up a few months after.

In all cases, the irrigation channels arising from the weirs carries and distributes eggs fry, and young fish into the paddy fields where they are entirely annihilated. The same thing happens in nature, during the rains, when the low-lying country becomes flooded. Working in co-operation with the Public Works Department steps are being taken to mitigate the evil results as far as this is possible.

Fishing areas :—

- (a) *Marine fisheries.*—Up to the present, the marine fisheries in the Bay of Bengal have not been exploited in spite of the fact that the experimental work done by Government in this area gave promise of results comparable with those obtained elsewhere. This circumstance may be due to the fact that capitalists regard the scheme as a new and experimental one, and prefer to invest in established concerns where profits are certain, and frequently high. I do not consider that the supply of fish in the province is likely to be adequate in future years unless the marine or the estuarine fisheries are tapped. The opening out of these fisheries would further provide opportunities which at present do not exist, for manufacturing fish-oil, manure and other bye-products. In addition, fish could be tinned, if desired.
- (b) *Estuarine fisheries.*—The Sunderbans fisheries cover an area of about 5,700 square miles and fishing over this area is totally unorganised. The railway taps certain portions such as Diamond Harbour, Canning, Khulna, etc., but much of the Sunderbans area is more or less inaccessible.

The difficulty in this case is purely one of organisation and transport. It is true that steamers belonging to the India General Steam Navigation Company pass through the Sunderbans frequently. But fishermen cannot utilise this service, because the steamers as a rule do not stop, *en route* from Calcutta to Goalundo, and secondly, because the fishermen cannot themselves bring their fish to Calcutta, and they know of no one to consign it to. Here again, the exploitation of the fisheries depends principally on capitalists. It should not be difficult to purchase and collect fish from specified places, at a certain time daily.

- (c) *Fresh-water fisheries.*—Whilst the European section of the community prefers marine and estuarine fish such as Bhekti (*Lates calcarifer*), Topsi (*Polynemus paradiseus*), Hilsa (*Clupea ilisha*), and various species of the Pomfret and Sole, the Indian prefers, and depends upon, fresh-water species. Carps, such as Rohu (*Labeo rohita*), Catla (*Catla buehanani*), Mrigal (*Cirrhina mrigal*), and Calbasu (*Labeo calbasu*) are in great demand. They occur in rivers and are extensively cultivated in tanks.

In addition, there is in Bengal a valuable turtle fishery. Pearl-mussels also occur, yielding a fair harvest of pearls. Until recently the shells were utilised in the manufacture of lime, but lately the manufacture of buttons from the shells has been on the increase. There are, to my knowledge, 2 or 3 factories possessing machinery, but, owing to the scattered distribution of the shell, they have not been successful commercially. One such company applied to Government for financial assistance. The application was rightly refused, as there was no probability of the company operating successfully until sufficient shell was available. It will be early enough to begin with machinery when shell can be cultivated in sufficient quantities to justify such a proceeding. In the meantime, the home industry should be encouraged, for by this means the best use is being made of existing material.

Chanks (*Turbinella pyrum*) are imported from Southern India into Dacca and other districts, in large quantities, where the shell is worked into bangles, rings and other ornaments. There might be scope for a limited amount of machinery in this industry, but it is believed that machinery tends to make the finished article easy of fracture. Moreover, the advent of machinery in this particular case would mean that the whole trade could be absorbed by one firm, leaving hundreds of present workers out of employment.

Edible oysters occur scattered about along the Orissa coast, and in the Chilka lake, but their cultivation has not been attempted yet. Apparently the demand for them in Calcutta is very small.

Button manufacturers.—I have already remarked that, in Bengal, pearl buttons and pearl ornaments are extensively manufactured. The industry centres round Dacca, and is a typical home-industry. The products are bought by Dacca merchants and sold either wholesale or retail. They recently complained that, owing to the importation of large quantities of Japanese buttons (due to stoppage of imports from Austria and Germany) there was no market for the local product. Government was requested to assist the sale of Dacca buttons by procuring markets. On enquiry it was found that the local product was not available in the Calcutta market (or only in very small quantities). Firms were found in Calcutta who were willing to take large quantities. Applications for quotations were also received from London and Bombay and it is almost certain that the demand is at present in excess of the available supply.

Fishing companies.—There are 4 registered companies in Bengal dealing either partly or wholly in fish. In addition, there are a few unregistered companies. There is one registered company in Assam, and at least one unregistered company in Orissa. Except in the case of one company (not situated in Bengal or Bihar and Orissa) the advice of the Fishery Department has never been requested by these companies. I am not complaining about this. I am merely stating the fact. In certain instances which have come under my notice the proposals attempted are, in my opinion, impossible commercially. In other cases it is evident that the entire capital will be absorbed in paying salaries, before any result could possibly be achieved. Even in the best instances the schemes could be easily improved upon. In no case has any dividend ever been paid. The failure in *band fide* cases has, I think, been due largely to proposals being attempted which did not admit of commercial success.

Co-operative fishery societies.—A few such societies have been formed in Bengal during the last two years. In order to understand clearly what our aims in this direction are, it is necessary to digress for a moment. Fishery rights, whether they belong to Government or to zamindars, are auctioned and sold to the highest bidder. Usually, there is not much competition, as this matter is commonly arranged amongst prospective lessees beforehand. The lessee, instead of working the fishery, often sub-lets it in smaller lots at a good profit, and this process goes on through several stages. The last lessee, often compels the fisherman to pay him a nominal sum for the privilege of fishing. He also takes half, or some such proportion, of the total catch and purchases the remaining half at whatever figure he determines—possibly 5 or 8 rupees per maund. The retail price of this fish ranges from Rs. 22 to Rs. 30 per maund. Our object was to induce fishermen to take leases direct, thus excluding the middlemen. We have been successful in doing this in a few cases. It was recognised, however, that unless we could arrange for the co-operative sale of their fish, the middleman would still be necessary. In one particular case, we recently arranged to place the fishermen's catches on the Calcutta market direct. It is too early yet to judge the possibilities of the methods adopted. Up to the present we have had great difficulty in disposing of the fish owing to the glut of fish in the market.

The present Fishery Department has been in existence for five years. More than three years were absorbed in enquiries of a general nature, and in ascertaining exactly what the problems were which we had to face. The fishery difficulties in Bengal are, in many respects, quite different in nature from those in other countries and even from those obtaining in, say the Madras Presidency. It was, I think, absolutely necessary to complete the general survey before taking up work of any special character. We now recognise fully the nature of the problems before us and their relation to each other.

The results of the work done to date are set forth in the following publication which have been issued by the department during the last four years :—

9 bulletins.

4 departmental records.

6 scientific papers published by the trustees of the Indian Museum.

It is, I think, hardly to be wondered at that the activities of the department are scarcely felt over such an enormous area as is covered by the Provinces of Bengal, and Bihar and Orissa, especially considering the fact that a considerable period of time has been occupied in the general enquiries already indicated. These enquiries have served to indicate the manner in which science can be applied, in a practical way, to the solution of fishery problems in Bengal.

In my opinion a constructive policy is required, based on an application and extension of the scientific methods indicated by the researches of the past few years. Up to the present, with the exception of the short enquiries conducted by Dr. Jenkins and myself no scientific investigation of the fisheries has yet been made. Having regard to the magnificent waterways found in Bengal, and the corresponding enormous potential food supplies contained therein, there is absolutely no reason why the supply of fish throughout the province should not be abundant, and the price cheap. This state of affairs can only be attained as a result of careful and long continued work on scientific lines but it is quite a mistake to assume that the appointment of scientific men will result in an immediate increase of the fish supply.

IV.—Recommendations.

It will, I hope, be clear that the department is lamentably understaffed, and utterly unable to cope with the work before it. No material progress will be possible until the staff is largely increased. I would invite a comparison of the staff of the Bengal Department with that of Madras, or with that of the present Agricultural Departments in Bengal and Bihar and Orissa. Having regard to the fact that I have had over five years experience of fishery work in Bengal and Bihar and Orissa, more than five years in Ceylon, and some experience at home, I do not consider it best, in the interest of all concerned, that my time should be so fully taken up with general work. I consider that I ought to be placed in such a position that I can devote practically my whole time to pure scientific work. At present, I have to deal with the settlement of fisheries, formation of co-operative fisheries, distribution of fry, agricultural exhibitions, protective measures, preparation of bulletins, general correspondence, the fish supply and the fish markets, fishery statistics, budget estimates, experimental operations, and a variety of other work too extensive

to detail here, all these matters having varying degrees of importance. Surveys of the fishery areas have to be undertaken as opportunity affords, and scientific work in the fisheries laboratory in the Indian Museum was, until recently, practicably confined to Sundays and public holidays. Owing to ill health I was reluctantly compelled to discontinue this practice. It is true that I could have devoted more time to the pure scientific work but this would have meant that the department, as at present established and recognised, would have ceased to exist.

The principal recommendation which I wish to make is an increase of staff. At present the department is little more than a name. If Government wish the department to be in a position to deal effectively with the problems before us, an efficient staff is absolutely necessary. It may not be possible at once to appoint a staff as large as the urgency and seriousness of the situation demands. But I consider that a beginning should be made immediately by appointing to each province two officers, one of whom should be a zoologist trained in a European school, and the other a man of business capacity. These officers, together with any subordinate staff who might be found necessary, should work under the direction of the present Deputy Director.

The scientific officer in each province would confine himself solely to pure scientific work, such for instance, as enquiries into (a) the general habits of the common edible and marketable fish, (b) breeding habits of the more important marketable fish, such as Rohu (*Labeo rohita*), Catla (*Catla buechanani*), Mrigal (*Cirrhina mrigal*), Calbasu (*Labeo calbasu*), Hilsa (*Clupea ilisha*), Bhikti (*Lates calcarifer*), Topsi (*Polynemus paradiseus*), etc., (c) artificial cultivation of the principal food fish, (d) food, parasitic diseases, fattening, rates of growth of fishes, (e) life histories of the species of mussels utilised in the manufacture of buttons, with a view to developing the industry, (f) breeding habits of turtles and oysters, (g) investigations into the breeding habits of Window-pane Pearl oysters (*Placuna placenta*), round Chittagong, (h) formulation of protective measures in accordance with the results of their enquiries, etc.

It would be necessary in the first instance to select Europeans for these posts, because no facilities at present exist in India for suitably training Indians.

The proposed non-scientific officer in each province would, amongst other things, undertake the following:—

- (a) Distribution of fry.
- (b) Development and supervision of co-operative credit societies as applied to fisheries.
- (c) Supervise experimental work.
- (d) Conduct general enquiries and continue propaganda work, throughout the province.
- (e) Enquire into the possibilities of better organising the trade in fish, etc.

I consider a European necessary for such a post as this, and I am of opinion that a soldier discharged from the army for reasons which would not unfit him for the above work, would be specially suitable, because such an individual, carefully selected, would be accustomed to discipline, hard work, and method.

I am further of opinion that the staff suggested represents the absolute minimum required. I am aware that after the War, Government contemplate appointing to the department a second trained European zoologist. It is proposed that after a probation of say five years, the individual appointed, if found suitable, shall be placed in entire charge of fisheries in Bihar and Orissa. This I consider satisfactory as far as it goes, but quite inadequate. Further, since the same fishery problems are common to both provinces I am not convinced that the separation proposed is in the best interest of either local Government. Hilsa migrate up the Bengal rivers and apparently breed in Bihar. The same, in a limited way, is true of carp. If fishery administration in the two provinces was separated, we in Bengal should be more or less debarred from prosecuting enquiries in Bihar and Orissa. An artificial demarcation of this kind is, I think, undesirable.

I would call attention to the excellent facilities which exist in Calcutta for zoological and fishery research. I have already referred to the fact that, through the kindness of Dr. Annandale, Director of the Zoological Survey of India, and Superintendent of the Indian Museum, the department has been extremely fortunate in obtaining a laboratory in the Indian Museum—the centre and headquarters of pure zoology in India. The museum library is by far the best in the East, and meets the requirements not only of general zoologists, but of specialists in particular subjects. For instance, with reference to a group of animal parasites known as Cestodes (in which I am particularly interested) I have found that all the literature necessary for a thorough systematic and anatomical survey was available in the library. Similarly, with reference to fish and fisheries, the available literature is singularly extensive. So far as scientific fishery enquiries are concerned, this circumstance is of the utmost importance. Soon after my arrival in India I had the honour to be appointed an honorary assistant of the museum staff, and I record with pleasure the great assistance I have received from time to time from officers of the museum (now the Zoological Survey of India) who, throughout my service in India, have been anxious to assist me and to co-operate with me, in any manner possible. Naturally, I have taken advantage repeatedly of this circumstance, even though the Fishery Department is in no way connected officially with the museum, or with the Survey. One body is concerned with pure zoology, the other with the application of scientific methods. The Fishery Department stands to gain immensely

by the advice and assistance of the Zoological Survey and it is most desirable that such co-operation should continue and extend.

In Bengal, the Fishery Department is controlled by the Agricultural Department, and the Director of Agriculture is also the Director of Fisheries.

In a communication from the Secretary of State I was recently confirmed in my appointment. The Secretary of State created a post of Director of Fisheries and appointed me thereto. As the local Governments, and the Government of India, had only requested my confirmation as Deputy Director of Fisheries it was believed that a clerical error had occurred in the communication from the Secretary of State. The local Governments have since approached the Government of India requesting that I be definitely appointed Director. If the Government of India agree to this proposal it is understood that the sanction of the Secretary of State will be required. At present I am acting as Deputy Director. From the time I joined the department I have had control over, and been responsible for, the work of the department. My experience has shewn, clearly, that no advantage has been gained by the department being subordinate to the Director of Agriculture. On the other hand it has often caused unnecessary delays. In Madras, there is a Director of Fisheries who deals directly with Government. I believe the same is true of the Warden of Fisheries in the Punjab. As far as I know, there is no reason why the Fishery Department in Bengal should be controlled by the Agricultural Department. It must be definitely understood, however, that the relations of the two departments to each other have always been of a satisfactory and cordial nature. The ground on which I assert that the departments should be separated is principally for reasons of efficient and easy administration. In addition, both local Governments concerned recognise that, since I am, and have always been, in executive charge of the department, it is only reasonable that this fact should be officially recognised. On this matter both the local Governments concerned and the Directors of Agriculture in each province, are agreed.

V.—An Imperial Fishery Department.

Fishery investigations in India are lacking in uniformity. Fishery Departments exist in the Madras Presidency, in the Punjab, in Bengal, and in Bihar and Orissa. There is no Fishery Department in the Bombay Presidency, in the Central Provinces, or in the United Provinces. Where Fishery Departments exist, there is some danger of overlapping. Thus, in the Madras Presidency and in Bengal, investigations into the breeding habits of Hilsa have been in progress for some time. Similarly in Bengal and in the Punjab, enquiries are continuing with reference to the breeding habits of Indian Carp. Whilst there is no particular harm in this overlapping, it is, I think, unnecessary and undesirable, and could be obviated if the work of one presidency was co-ordinated with that of another. Thus, the experiments made, and the results obtained, by Sir F. W. Nicholson in the Madras Presidency with reference to curing and salting fish, etc., have rendered it unnecessary to repeat these experiments anywhere in India. Similarly it ought to be possible to obviate overlapping in other investigations. I am not here attempting to make out a case for the establishment of an Imperial department. I merely wish to state that, in my opinion, such a department is necessary at the present time, and will become increasingly so as years go by. If such an Imperial department is ever established the Director should be a scientific fishery expert of established repute. Fishery Departments should be initiated on the lines suggested for Bengal, and Bihar and Orissa, in provinces where at present none exist. The Director would supervise, co-ordinate, and assist in developing, the work in each province. The local fishery experts would submit programmes of work. If these were found satisfactory, the local official would be free to prosecute his enquiries without further undue interference. I have, of course, merely indicated, broadly, the type of Imperial department which I consider desirable. It would differ from, say, the Zoological or Geological Survey, in having officials stationed permanently in each province.

ORAL EVIDENCE, 4TH JANUARY 1917.

President.—Q. Your note is very detailed and clear but there is one point about which I should like to ask, and that is with reference to what you say in one part of your printed note. You say that the foreshore fisheries at Balasore over a length of about 15 miles are administered by the Ordnance Department. What Ordnance Department do you refer to? You mean of the Army?—A. Yes.

Q. With reference to what you say about the effects of irrigation schemes on the fisheries, can you think of any remedy that can be devised so as to combine both the value of irrigation and the development of fisheries?—A. The Fisheries Department are at present working in conjunction with the Public Works Department to mitigate the evil effects that have so far occurred, but the difficulty is the enormous area over which observations have to be conducted. It is at present impossible to supervise carefully 30 or 40 miles of canal irrigation, and the chief difficulty in carrying out improvements as regards the Public Works Department fisheries is the shortage of men. Hence recommendations made cannot be carried out.

Q. From the point of view of the fisheries providing a great source of food supply you think that a much greater outlay on staff is justified?—A. Most certainly.

Q. You point out in your note that the study of fishes will extend beyond provincial limits and therefore it would be a matter for an Imperial department to take it up. Accepting that conclusion for the time being, do you think it will be practicable to divide fishery operations into two great groups, the scientific side, taken up by an extension of the Zoological Survey, and the practical side, taken up by some other department which may be imperial or local?—A. That is a difficult question to decide. My view is that fishery work can be divided into three great groups. First of all there is the purely scientific work. At the present time we know very little about the habits of the common fishes. If we wish to protect the fisheries we must know the life histories of the fish, when they breed, where they breed, how long it takes them to develop, etc. In other words, we must know the habits of the fish before we can protect them. The second part is the question of protecting the fisheries, and then there is the question of marketing the fish. All these questions are being investigated by the Fisheries Department. It is essential that they should be considered together. Up to the present I have been engaged in general surveys of the above questions.

Q. What is the third that you have mentioned?—A. First of all there is scientific investigation. The second division comprises what I have already detailed. It may be considered under two heads, the actual marketing of fish, and the organization of the fisheries.

Q. Is it in your opinion practicable for the scientific officer to be a member of the Zoological Survey and to have the members of the Fisheries Department composed largely of practical men who understand the organisation of fisheries, the marketing of fish and the formation of co-operative societies among fisherman?—A. I think the scientific officer ought to be a member of the Zoological Survey,—by this I mean an honorary member of the Survey.

Q. If you bring into the service two dissimilar kinds of men, *viz.*, scientific zoologists and practical organisers, would this not introduce difficulties in the matter of promotion?—A. I do not propose that. For instance a man might be in charge of fisheries in a particular province and he might also be a member of the Zoological Survey of India, still being in charge of the Fisheries Department. I think it will be a great mistake in any province to have officers who went along two parallel lines. It is desirable that a department should have a separate head and that whoever happens to be the head of a department should see that unity and harmony in the work is secured.

Q. What I am trying to find out is whether the scientific officers devoted to fishery work should be members of the Zoological Survey or whether you like to have a separate Imperial Fisheries Department including a certain number of the scientific zoologists?—A. My opinion is that an Imperial Fisheries Department should be formed.

Q. How is it to be composed?—A. At the head there should be a scientific officer, and he would determine what assistance he required. The staff might be small. It would increase as time went on. He would be the Imperial head of fisheries in India. In provinces where there is no Fisheries Department he would appoint, along with the local Governments concerned, a fishery officer for that province, or more if thought necessary. These, in the first instance, would be scientific officers.

Q. These scientific officers would be members of the Zoological Survey?—A. They might be members of the Zoological Survey in the same way that I happen to be an honorary assistant to the Indian Museum.

Q. They might be lent to the Fisheries Department?—A. Not necessarily specially connected with the Zoological Survey of India. The Fisheries Department is not connected with the museum or with the Zoological Survey of India but I am an honorary assistant in the museum. The same relationship could exist between the Zoological Survey and the proposed Imperial Fisheries Department. My point is that the Zoological Survey in India is not in a position to take up the question of fisheries in India.

Q. I never suggested that. I do not say that the Zoological Survey would be in a position to develop the business side of fisheries. Should these scientific officers who are attached to the Fisheries Department be members of the Zoological Department or should they be on a separate list altogether?—A. My personal opinion is that it would be desirable to have an Imperial Fisheries Department that was quite distinct from the Zoological Survey, with zoological officers entirely of its own.

Q. What arrangement would you make for their promotion? How many would you employ?—A. That all depends upon the type of officers. For instance, in Bengal there is room for half a dozen expert officers. I would have as many as the necessities demanded.

Q. Can you give us any idea for the whole of India?—A. I am not in a position to speak for the whole of India because I have not seen the Central Provinces or the United Provinces. But in Bengal I would point out that the problem is more acute than in any other province. The Bengali people are greater fish eaters than people in any other province.

Mr. C. E. Low.—Q. Speaking about the appointment of a Fishery Board do you mean that it is not working?—A. It is dormant. It has never met since 1908.

President.—Q. But doing no harm?—A. I was not here when it met but from the reports I have read I should think its sphere of usefulness was extremely limited.

Mr. C. E. Low.—Q. You say that up to the present the marine fisheries in the Bay of Bengal have not been exploited in spite of the fact that the experimental work gave promising

results. What do you attribute this to?—*A.* I attribute it to the fact that in Bengal capitalists are not prepared to initiate a new industry of this kind.

Q. Have not any firms nibbled at it?—*A.* They have smelt at it. They have enquired about it. Monopolies have been asked for in case they are taken up. Enquiries of that sort have come to hand, but nobody has ever done anything.

Q. I have seen statements in the press that the "Golden Crown" was an unsuitable boat and could not get as much fish as might be got in a more suitable boat. I should like your opinion as to whether these facts are correct. Would its failure account for the reluctance of private capital?—*A.* I never saw the boat. I believe she was old fashioned. I am not certain that that fact seriously reduced the catches or stood materially in the way of the ship catching as many fish as a more modern boat might have done.

Q. I saw it stated that she could only do half of what other more suitable boats could?—*A.* I believe that is true to some extent, but to what extent I cannot say.

Q. The whole point of the enquiry is this, whether it is not the case that, if a more suitable boat had been used, and if better results had been obtained in the way of fishing, then private capital would come in?—*A.* Perhaps it might. I did not think that the original object of the survey had anything to do with the marketing of fish. It was a purely scientific investigation. It is a fact that the "Golden Crown" fish were sold in the Bazaar, but it was only to realise what money was possible rather than throw the fish away. That is what I understood.

Q. You say then that the two things are different. Supposing Government had gone on with the experiment to a further stage and shown it to be a marketable proposition then private capital could have been induced to come in?—*A.* It is likely, if the experiment had included that sort of thing. I understand that Government were hardly prepared to consider that side of the proposal.

Q. Do you think it would have been a good thing if they had done it?—*A.* Probably it would have been. I do not think the whole operation was managed as well as it might have been. A great deal of misunderstanding exists among the public. People, whom I have spoken to, say that the "Golden Crown" made a mess of it. This was not the case. The scientific results were first class. The management in other respects was certainly capable of being improved upon. What I say is that the general public understand that the ship went into the Bay of Bengal to obtain and market fish. That idea is, I understand, totally wrong.

Q. You say that 'it is decidedly unfortunate that neither of the officers under the Fisheries Department had any training in zoology or natural history.' Was there no means available of giving them such training?—*A.* It would have been very very difficult. I do not say that it was impossible.

Q. With reference to future recruitment how would you try to get the right kind of man?—*A.* My opinion is that in India you cannot get the type of man wanted. At the present time there are practically no facilities for training Indians in zoological work.

Q. Has any action been taken by the Bengal Government under Act IV of 1897?—*A.* The Bengal Government have not considered the subject. We cannot very well initiate a scheme for the protection of fish when we are not sufficiently familiar with their habits and until then I cannot see how we can enforce extensive regulations for the protection of fish.

President.—Q. The whole thing turns on the scientific problem, that is knowing more about the science of fishes?—*A.* Although the scientific enquiry into the habits of fishes is of the utmost importance, the actual application, later on, will be a subject of the greatest difficulty. The difficulty is much greater here than in any other country I know of. The manipulation of the market is a big question and even if we had solved the life histories of the principal food fishes we should only then be at the beginning of the real problem.

Mr. C. E. Low.—Q. You know something about the Agricultural Department as you come into contact with it. Take Bengal. Do you think that a similar organisation would be suitable in the case of fisheries?—*A.* My connection with the Agricultural Department is largely confined to formalities, such as budget estimates and so on.

President.—Q. Mr. Low wants your opinion as to whether such a system would be suitable. There, they have the scientific work divided between a set of officers, and the results are translated into practice through the agency of the local Deputy Directors?—*A.* It all depends upon the Deputy Directors themselves. The selection of the individual is everything. At the present time we control an area twice as large as the British Isles.

Mr. C. E. Low.—Q. These scientific officers of the Agricultural Department are engaged in advising what crops can be grown under commercial conditions, which corresponds in your case to the catching and protection of fish, and there are the co-operative societies for the distribution of seed which corresponds in your case to the marketing of fish. That is a fairly close analogy. These scientific officers are under the Director of Agriculture. Would that kind of thing suit you?—*A.* That is what we want for the Fisheries Department. But the titles do not matter much. My opinion is that we want men to deal with the scientific side of the problem exactly as is done in the Agricultural Department.

Q. The Deputy Directors of Agriculture are men who have scientific training and are specialists, and men who have had direct experience in farming at home, preferably the sons

of farmers. Are there any men of that sort who would be available for the Fisheries Department? Is it not the case that in pitching the recommendations rather low you are afraid that Government will not be able to take up any big schemes such as that I have suggested?—*A.* No. All I mean is that at the present time we cannot deal with the work. I recommend an increase of the scientific staff and we require more men to do general work. I have indicated the manner in which that could be brought about.

Q. What should be the qualifications of the administrative officer?—*A.* The man who is to administer the department must know something about fishery work. Government could easily decide who would be a suitable man. If the fisheries are going to be the slightest use we want two types of officers, men to undertake the general work and men to undertake the scientific enquiries.

President.—Q. Could you get a man of the officer class with special training?—*A.* I think so.

Mr. C. E. Low.—Q. What share would the Co-operative Registrar take in connection with work in the case of the co-operative fisheries?—*A.* The limits are not defined, because the whole thing is in an experimental stage. We are at present working conjointly. There are 48 districts and the waterways are immense. We are to consider whether it is possible to have co-operative fisheries established. If co-operation is to be extended it is utterly impossible for the Co-operative Registrar and myself to extend beyond a certain limit.

Q. Would the number of fisheries be very large?—*A.* I should estimate that about one-tenth of the fisheries in Bengal belong to Government. This includes fisheries that are administered by Collectors, and also by the Public Works Department officials.

Q. Apart from the inherent right of Government to waters, private rights have been claimed in fisheries in tidal waters. Has the Government undertaken any general enquiry into the matter?—*A.* I do not think so. Particular cases have arisen for the orders of Government. But up to the present the general question has not been taken up by Government. I can indicate a type of case. The Sunderbans area is leased out by Government in lots. Most of these lands are surrounded by rivers. The idea is to cultivate the land for paddy. Instead of so doing, in some cases a bund is erected round the area. During high water the rivers are tapped. The cultivatable lands thus become small fisheries. That happens during the rains. In the dry weather all the water is run off and the fish caught. A case like that is now before Government and the question is whether the lessee has the right thus to tap the rivers. But the general question of the fishery rights in the Sunderbans has not been considered by Government.

Q. Do you think that can be taken up as a general question and definite conclusions come to?—*A.* I think it is much better not to take it up at present.

President.—Q. Would you tell us shortly your own history? Are you a man of university training, trained in one of the fisheries at home?—*A.* I was trained more or less privately until I was 15 years of age. I then took up zoology and natural history in a secondary school in Lancashire. About four or five years afterwards I won a Government national scholarship tenable in the Royal College of Science, London. I was there for three years and took my diploma in 1905. The same year I was appointed demonstrator in zoology in the college (*i.e.*, in 1905). Owing to the illness of the assistant professor I had charge of zoology under Professor Dendy for one term. I then went to Liverpool to work as private or personal assistant to Professor Herdman who, at the invitation of the Colonial Office, had been investigating the pearl fisheries of Ceylon. He brought back a large quantity of material and I assisted the Professor in sorting out and examining the material. I also wrote portions of the report under my own name. In the meantime the Ceylon pearl fisheries had been leased out to a syndicate, the chairman being the late Governor of Ceylon. I was selected to have charge of the scientific enquiries in Ceylon under a manager. Shortly after my arrival in Ceylon the manager left the company and I was appointed to take charge both of the executive operations and the scientific investigations on the Pearl Banks. In 1911, at the invitation of the India Office, I came to Bengal. I have carried out fishery investigations in the Bay of Biscay. I have also studied fisheries in Holland.

Q. You really commenced as a scientific zoologist?—*A.* Yes.

Q. This training might be equivalent to the training of a Deputy Director?—*A.* Yes. I have been engaged in fishery work for over 12 years now.

Sir F. H. Stewart.—Q. You say in your written statement that the marine fisheries have not been exploited although they gave promising results. Have you got any suggestions to put forward as to the way in which Government could help?—*A.* That is a difficult question. If the marine fisheries could be opened out, I think they could be made to pay.

Q. Have you any suggestions as to what Government can do in the way of facilities or concessions?—*A.* I do not think any concessions have been asked for. It is quite clear what machinery is required for opening out the fisheries. It is also known what amount of capital would be required. I have not thought out the specific manner in which Government could help any particular firms or private individuals. I have gone very carefully into the kind of boats that would be required, the organisation necessary, etc., and I even went so far as to submit to the Chamber of Commerce, through the Government of Bengal, a definite scheme to which the Chamber paid no attention.

Q. Did you place your information at the disposal of responsible people?—*A.* Yes. No one has even asked me for any information.

Q. Supposing private enterprise takes up the business, would it have to introduce modern methods of fishing?—*A.* Yes. Whilst in Ceylon I had experience trawling in an area similar to that of the Bay of Bengal and I feel that, in this matter, I can speak with a certain amount of experience. What would be required in the Bay of Bengal would be at least a couple of steam trawlers similar to, but much larger than the "Golden Crown," and a couple of carrier boats. The idea would be to have the trawlers always at work. The smaller boats would bring the fish up the river.

Q. Would you require to introduce modern methods there?—*A.* Yes. The Chilka lake, on the other hand, is an instance of an area difficult to exploit. There you have changing conditions. The lake is salty in the dry season and practically fresh in the rains. In addition, the manipulation of the fishermen is far from being a simple matter.

Q. Supposing it was the question of the development of the Chilka lake, what would be the best way of setting about it? Would you have to work the fisheries on up-to-date lines or would it be better to leave the fishing to be done in the present old fashioned methods?—*A.* It is difficult to explain precisely. Any action in regard to the Chilka lake is very difficult for a variety of reasons which it would take me a long time to explain. In the particular case of the Chilka lake I think the local methods of fishing leave nothing to be desired. The difficulty comes in in organising the local trade. Another difficulty occurs in determining the lines of demarcation between Government fisheries and other fisheries, whilst the actual sale and purchase of fish is likely to present quite a number of difficulties one never anticipated.

Q. You say that in one particular case you arranged to place the fishermen's catches on the Calcutta market?—*A.* What happened was this. There is a fishery in the Ganges extending from Malda to Rajmahal. The length is 55 miles. Two years ago this particular fishery was leased for about Rs. 4,000. When inspecting the fishery I was informed from a reliable source that the lessee was making a profit of about Rs. 30,000. He had sublet it in small lots to other people.—The Collector of Malda, the Registrar of the Co-operative Societies, Bengal, and myself went there and persuaded the fishermen to take the lease direct from Government. This they did. We recognised at the time that although we had eliminated the middleman from the lease he was still a necessary agent for marketing the catches. We thought it premature at that time to try to market the fish as the fisherman did not grasp clearly the principles of co-operation. Eventually they asked us to market the fish. They consigned the fish to me direct in Calcutta. I tried to sell it retail and failed owing to a glut of fish in the market. I found no difficulty in selling the fish wholesale through an auctioneer who charged about an anna per rupee on the sale.

Q. Have you had any difficulty in arranging it?—*A.* We had very great difficulty. The fishermen are very unreliable.

Q. Have you been able to go into the question of the bye-products?—*A.* I should estimate that 40 to 50 per cent. of the catches in the Bay of Bengal would be fish that would not be suitable for the Bengal markets. These could be used for the manufacture of fish oil, fish manure and a variety of other things.

Q. And fish curing?—*A.* That could also be done.

Q. All these could be worked up by private enterprise?—*A.* The success of fishing operations in the Bay of Bengal would not depend absolutely on the catches of edible fish. The value of the various subsidiary industries would be great.

President.—*Q.* Would that be continuous?—*A.* Yes.

Q. What would be the capital required?—*A.* I have dealt with it in a paper here, which I could show the Commission.

Sir D. J. Tata.—*Q.* With reference to the "Golden Crown" was its work confined only to finding out the banks?—*A.* It was only a sort of survey to find out what kinds of fish could be found.

Q. There was no attempt made to find the banks?—*A.* That was part of the scientific work and fishing banks were found and charted.

Q. Has any attempt been made to chart the western coasts?—*A.* It has been attempted round the coast of Ceylon with a view to the discovery of pearl oysters.

Q. Twenty-five years ago we made some enquiries on the Bombay side and there was no information available?—*A.* I may say that in the Madras Presidency, on the Calicut coast, the proposal is to have two small boats in order to carry on the type of work that was carried on here by the "Golden Crown."

Sir F. H. Stewart.—*Q.* Do you know whether there is any prejudice against eating dried fish or cured fish?—*A.* I think there is some prejudice. There is also prejudice against eating sea fish. Dried prawns are exported to Burma from Bengal.

President.—*Q.* If there is a prejudice against eating sea fish, how are you going to get any return?—*A.* It will still give you 5 or 6 per cent.

Q. Then the commercial men will not look upon the trade with certainty?—*A.* In any case the question requires very careful consideration. I am interested in what fish can be

caught, the quantities that can be caught, etc. I do not pretend to be an expert in the business side of the proposal.

Q. Then how do you say 5 or 6 per cent.?—A. I am merely quoting from memory. I am not sure of the details, set forth in my paper referred to previously.

Q. So far as your memory goes the proposition from the business side leaves you with only 5 or 6 per cent.; and this being a new line, do you think there is any hope of getting a business firm to take it up?—A. I should imagine that in Calcutta, under present conditions, it is not likely that the fisheries will be taken up.

Q. Is it not necessary for the Government to show it as a commercial proposition beginning where the "Golden Crown" left off?—A. I think it would be a very good thing to do.

Q. Is it not obvious that 5 or 6 per cent. is not going to attract people?—A. When I said 5 or 6 per cent. I was speaking from memory. What I meant was that I think the business would be profitable.

WITNESS No. 169.

Dr. M. Mitra.

DR. M. MITRA, Surgeon, Proprietor, Lister Antiseptic Dressing Company, Calcutta.

WRITTEN EVIDENCE.

From a long time I have been taking an interest in the manufacture of various kinds of surgical dressings prepared from raw materials available in India. I thought articles thus manufactured ought to be cheaper than imported ones, and at the same time contribute on a small scale towards the industrial development of the country. I had no doubt in my mind that these dressings would be equal to the imported articles from a surgical point of view. From time to time I made experiments on a small scale which proved successful so far as their quality was concerned. Soon after the war with Germany had been declared the prices of all surgical dressings became very high, and to me the opportune moment seemed to have arrived for venturing into the manufacture of dressings on a large scale.

Capital.

In the beginning of 1915 I started a factory under the name of the "Lister Antiseptic Dressing Company" with a small capital found by myself. I did not intend the company to be a joint stock one at the start as the fate of a number of joint stock companies recently started in Bengal was not very encouraging and as this concern required a certain amount of medical knowledge.

Other difficulties.

I have experienced several difficulties in the course of my work, and as they affect not only my industry, but most of the new industries started by Indians, I should like to mention them—

- (1) The machinery required could not be had in this country and considerable difficulty was experienced in getting it out. The price which we had to pay was very high on account of the War and the freight and other incidentals also came to a very high figure.
- (2) As a large part of the capital was absorbed in capital expenditure on land, building and the machinery, we experienced some difficulty about our working capital. I did not approach any of the banks, as from information received I came to understand that they would not advance money to an Indian concern on such security as I had to offer.
- (3) There was also a difficulty because there was no scientific or technical department of the Government equipped with analytical laboratories and a staff of experts to whom problems arising during the course of manufacture could be referred.
- (4) The absence of works of reference in the Imperial Library bearing on technical subjects also caused some difficulty. This could be remedied by technical libraries, which would have a classified collection on technology, under trained librarians who know something and can help in matters requiring guidance for industrialists.
- (5) The price we had to pay for chemicals was very high, and even then the supply could not be relied upon in all cases. The success of all industries like mine would depend upon this facility and unless greater attention is paid to such a key-industry as the manufacture of chemicals in this country, our dependence on foreign supplies would be complete and the chances of final and permanent success small.
- (6) The American medicated and absorbent cotton is valued because of the long-stapled cotton used in it. My desire is to manufacture an article which will beat this stuff. Our production already excels all imported varieties except the American. But we are handicapped by the absence of long-stapled cotton free from other matter in this country. When we buy the imported American or Egyptian cotton, we have to pay very high prices because we buy in small quantities and cannot afford to buy in large quantities and store them. If the Government could let us have cheap long-stapled cotton in small quantities from their experimental farms it would help us very much.

- (7) The largest purchaser of medicated cotton in this country are the Government Medical Stores, from whom I have not received any such encouragement as the quality of cotton and jute prepared by me deserved.

I approached His Excellency the Viceroy through his Private Secretary and the Director-General to the Government of India. I was given to understand that the surgical dressings required by the Government are manufactured in Government factories and it would not be possible for the Government to help us in this matter. The medical public and those dealing in these articles are not aware of such factories owned by Government. It would be an advantage and would avoid much miscalculation on our part if the Government could publish their total output and other particulars of such factories. Nor is it easy to understand their purchasing outside if they have such factories working. Although I had approached the Surgeon-General in 1915, I understand that since then the Medical Stores Department have been buying cotton absorbent and medicated from the Elgin Mills and Messrs. Andrew, Yule & Co. No question has been raised, nor can be raised as regards the quality (absorbent power and perfect sterilization) of my cotton as certified by Sir Leonard Rogers (copy below).

From my experience of this industry as well as from my general observation of industrial conditions of Bengal, I think that the industries started by Indians suffer from many disadvantages and the Government must assist them in various ways against foreign competition. The help required to be given in each industry would depend upon local circumstances and conditions of the industry. But in general the following are the various forms in which I would recommend action to be taken by the State.

- (1) Subsidy by way of preliminary expenses should be given to some new industries. Bounties should be given when it is desired to encourage large production or special development for export purposes.
- (2) Loans with low rates of interest should be available to industrialists on such security as they can generally offer, *viz.*, mortgage of the factory and plant. As private banks cannot and will not do this, the State should finance or otherwise assist the starting of special institutions known as industrial banks or by some departmental machinery make available for the industries some part of the State funds.
- (3) Import duties on machinery, low as they are, form still a burden and for all industries started with a small capital, there should be a total exemption.
- (4) The freights on machinery imported tell even more heavily on industries than the duties. With lines profiting from the Government in the mail contract or otherwise, there should be a reduction in freights for *bona fide* small concerns on their machinery and plant imported from abroad. This will be very good for the English manufacturers of machinery as it will be an inducement to people to buy their machinery from the United Kingdom.
- (5) Whenever any goods are required for a Government department or a municipality or the railways, the products of Indian concerns should be taken. And in such cases a guarantee of purchase of such produce for a number of years should be given.
- (6) The cost of sending boys abroad for study is very high. So that by spending much money we get only a few trained men. Imported experts are so costly that only the very promising industries can afford them. Then these students returned from abroad do not know for some time Indian conditions and requirements. All these difficulties could be got over by proper organisation of technical education in this country. This expenditure would be very economical in the long run. And to give our men a finishing touch, they may be sent abroad after they have worked here and known our wants and difficulties.
- (6) Railway rates are, in this country, based on purely commercial basis so as to get maximum revenue for the railways. But if there is a strong opinion for industrial growth in the country—in response to which this costly Commission is appointed—it implies that the temporary loss of a fraction of railway revenue is a matter of small consequence when by some favourable rates the end in view can be achieved. The Government should appoint a special official or charge the Director of Industries in each province to look into the matter and recommend such concessions as he thinks are necessary.

In my opinion Government should establish both pioneering and demonstration factories. Government should at first select such industries which require large capital or for which there are sufficient raw materials available in this country, then open pioneering factories and these when successful should be handed over to private capitalists or companies. I would not advocate the conversion of successful pioneering experiments into permanent Government enterprises as that will lead to undesirable competition with private enterprises.

In this country there is practically no means by which one can discriminate bad or good quality of articles manufactured in India or imported from abroad. Consequently many articles of inferior quality are passed off and charged for as superior ones. I consider a system of Government certificates of quality will encourage manufacturers to do their best.

Prevention of
adulteration.

This will lead to a healthy competition amongst the manufacturers and greatly benefit the public. This should be made absolutely compulsory in case of drugs and surgical dressings whether they are manufactured in India or imported from abroad.

A committee of experts should be organized by the Government whose duty it would be to report as to the quality of articles for which a certificate has been asked.

An Act for the prevention of adulteration of food and drugs similar to that prevailing in England is greatly needed in this country.

Report by Lieutenant-Colonel Sir Leonard Rogers, Kt., C.I.E., M.D., F.R.C.P., I.M.S., Professor of Pathology and Bacteriologist to the Government of Bengal, dated 21st August 1915.

I have examined bacteriologically two packets of boracic wool sent by the Lister Antiseptic Dressing Company, Calcutta. It was carefully packed and proved to be highly absorbent. It was quite sterile as regards bacteria, nothing growing in broth inoculated with portions of the wool.

ORAL EVIDENCE, 4TH JANUARY 1917.

President.—Q. I understand that a good deal of antiseptic cotton wool has been manufactured by the Bengal Chemical and Pharmaceutical Company?—A. They do not make any. They have it made somewhere else.

Q. You want to tackle the problem a little more deeply in order to make medicated cotton wool?—A. Yes.

Q. You find it difficult to get long stapled cotton?—A. That is one difficulty.

Q. How are we going to help you in that matter?—A. I was suggesting that if the Government could give us some cotton which they grew in their experimental farms, we could get some good cotton. The American cottons are the best, but we can compete with American cotton on account of our low price.

Q. You can compete with American cotton if in India there is long stapled cotton on the market?—A. Exactly so.

Q. Would it be of advantage to the public if the Government gave you this particular long stapled cotton for the manufacture of antiseptic dressings?—A. Antiseptic dressings forms one of the important items of surgery and medicine. We do want only small quantities.

Q. Are they making this cotton in the Medical Stores Department?—A. As far as I know they are not making. I am not quite sure.

Q. They are importing?—A. Yes, so far as my information goes.

Q. You mean they are importing in a medicated condition?—A. Yes.

Q. They are not importing the raw cotton itself?—A. No. Only medicated and absorbent cotton.

Q. Is your factory still running?—A. Yes.

Q. Are you importing long stapled cotton?—A. No. We are buying as much long stapled cotton as we can get here.

Q. Are you importing it also?—A. I am not importing it from outside.

Q. You are buying it all in India?—A. Yes.

Q. And get here all you want?—A. Yes.

Q. At good prices?—A. That depends entirely on how much we can sell. If we can sell our entire output, it will be a successful business.

Q. Are you selling it to the Medical Stores Department?—A. No.

Q. You have given them samples?—A. Yes.

Q. And the samples are satisfactory so far as Sir Leonard Rogers's certificate is concerned?—A. Yes.

Q. Did Sir Leonard Rogers give the certificate on your behalf?—A. Yes. We sent him samples and asked him to certify whether they were good.

Q. Did it go direct to Sir Leonard Rogers or through the Medical Stores Department?—A. I think it went to Sir Leonard Rogers. It forms part of his private practice.

Q. And he charges you a fee for giving you this certificate which he allows you to use?—A. Yes.

Q. Is this frequently done?—A. I think so. In the Medical Department they always do that. The Chemical Examiner gets certain things from outside for chemical examination and gets his fee for that.

Q. Of course, you do not know whether Sir Leonard Rogers got the sanction of Government for making this examination and allowing you to use this certificate?—A. I am not quite sure about it. He was asked whether I could publish this certificate and he said "yes."

Hon'ble Sir R. N. Mookerjee.—Q. Can you give us any reason why the Government preferred Messrs. Andrew, Yule and Co.'s cotton to yours?—A. I cannot say. It is not possible for me to know why they gave preference to Messrs. Andrew, Yule & Co.'s cotton. When there are European firms, they generally get the better of it.

Q. Messrs. Andrew, Yule & Co. make them here.—A. Yes.

Q. They have got a similar factory?—A. They make it as a side show of theirs.

Q. Why did not the Medical Stores Department take it from you? They are quite independent of European and Indian?—A. That depends upon the heads of the departments. If the Director General does not order they cannot take.

Q. Have you addressed the Government of Bengal?—A. Yes.

Q. Had Mr. Lindsay been to your factory?—A. Yes. He saw our cotton and gave us a very good certificate and he said that he would try what he could do. That was only recently, about a fortnight ago.

Q. What is your capital outlay?—A. About Rs. 56,000.

Q. Are you paying any dividend on that capital?—A. I do not think we are paying yet.

Q. Have you any prospect of giving a dividend in the future?—A. Yes.

Q. You want Government to buy your cotton as they are buying from others?—A. Yes. A certain proportion of orders they might give to us.

Q. You were a Government servant?—A. Yes.

Q. And when you were transferred you resigned?—A. Yes.

Q. And you were in bad graces with the Government?—A. I do not think so.

Q. They won't reinstate you again?—A. No.

Q. They did not like you to resign?—A. No.

Q. And there was some correspondence about it?—A. Yes.

Q. And that gentleman is the Director General now to whom you are writing?—A. Yes. But the Director General had nothing to do in the matter of my appointment. It was the Government of Bengal that dealt with my case and the Government of India would not interfere in the matter.

President.—Q. Can you give us the correspondence on which you base this statement. "Although I had approached the Surgeon General in 1915, I understand that since then the Medical Stores Department have been purchasing cotton absorbant and medicated from the Elgin Mills and Messrs. Andrew, Yule and Co."?—A. I have got it. (Witness produces one letter from the Private Secretary to His Excellency the Governor of Bengal to him.) The Surgeon never replied to our applications or did anything.

Q. This letter does not help you or us any further with regard to where the Government depôts get their boric wool from?—A. Prepared under Government supervision, that is what they say.

Q. And yet you say that they are buying from outside?—A. Yes.

Q. You wrote in 1915 and got no reply?—A. Yes.

Q. Have you sent any reminders?—A. We have approached them recently again. We have not got any reply to that yet. It was in October last that we wrote to them and I have had no reply.

Q. You offered boric wool at definite prices and in constant quantities?—A. Yes.

Q. You do not mind our writing to the Director General of the Indian Medical Service asking him whether he has received your letter and whether he could tell us confidentially his reasons for not taking any action on it?—A. No.

Mr. C. E. Low.—Q. What long stapled cotton do you want?—A. Messrs. Johnson and Johnson have the largest sale of medicated cotton in India. They sell cotton worth about 2½ lakhs of rupees every year, and their cotton, as far as I know, is made from Sea Island cotton, which is very long stapled. We tried as far as we could, but we could not get it anywhere in India. The next best thing we should like to have wherever we could get it. We may not be able to make an equally good stuff like Messrs. Johnson and Johnson's, but we could make good ones.

Q. What part of India do you get your long stapled cotton from at present?—A. We get it from the Central Provinces.

Q. In the Punjab American cotton is grown?—A. That is what I really mean when I say that I should get cotton from Government.

Q. Did you write to the Punjab Agricultural Department?—A. Mr. Lindsay has promised to do that for me.

Hon'ble Sir R. N. Mookerjee.—Q. What are the total requirements?—A. About 10,000 lbs. a month.

Q. That would be more than all the Government firms put together could supply you?—A. We sell about 5,000 lbs. and we ought to have a sale of 10,000 lbs. per month. We

know that it is sold in large quantities. I saw the figures about the imported articles, and I found that about five lakhs worth of medicated cotton are sold in India every year.

President.—*Q.* You have a fairly good market?—*A.* We are getting on fairly well.

Dr. E. Hopkinson.—*Q.* To whom do you sell?—*A.* We are selling to the medical shops and dispensaries. Some civil surgeons are ordering things from us. I want the Government to buy something from us as it will give us a status.

Q. Do you know what cotton the Elgin Mills use?—*A.* I do not know. I believe they make it from cotton waste entirely, and not long stapled. It would be better if long stapled were used.

Q. There is an enormous difference in price between long stapled and short stapled?—*A.* So, there is a good deal of difference between Messrs. Johnson and Johnson's price and our price. Ours is almost fifty per cent. less.

President.—*Q.* Do you make your own boric acid?—*A.* Yes.

Q. From borax obtained locally?—*A.* We are getting it locally and we are trying to get it from the Punjab.

Mr. C. E. Low.—*Q.* Is it really necessary for you to use long stapled cotton?—*A.* Not absolutely necessary, but only to compete with Messrs. Johnson and Johnson.

Q. You do not mean to use it largely?—*A.* Hospitals would not be able to afford to buy such kind of cotton.

Q. Your demand for long stapled would be quite limited?—*A.* Yes.

Q. Do you get your cotton from the Agricultural Department in the Central Provinces or here?—*A.* I buy it from merchants here.

President.—*Q.* Do you know where the Medical Stores Department are getting their cotton from?—*A.* I believe they get from Messrs. Robinson & Co. in England.

Q. And they medicate the cotton?—*A.* I do not think so.

Q. It has not been actually done in the Medical Stores Department?—*A.* No. They are all medicated in England and brought here. They get all their medicated cotton prepared in England, but of course, I understand that they are getting it from Messrs. Andrew, Yule & Co. and the Elgin Mills also.

Q. Boric wool is obtained from Government Medical depôts which seems to suggest that it was prepared there?—*A.* It has not been prepared by them, as far as I could gather from the information I have got.

WITNESS No. 170.

*Mr. J.
MacGlashan.*

MR. J. MACGLASHAN, *Central Provinces Sugar Syndicate, Co., Ltd.*

WRITTEN EVIDENCE.

Capital.

My only experience in raising capital has been for a Syndicate in the Central Provinces to test lands for cane growing possibilities. It looked a good proposition and there was no difficulty about that part of the capital to be supplied by Europeans. With the small amount set aside for Indians there was difficulty and little of it was taken up. This Syndicate was prepared, when information on manures, cane varieties and yields had been obtained, to proceed with the development of the lands and put down plant, and, though pioneering in the matter of growing cane in the Central Provinces on a large scale; had obtained no assistance in the way of special terms from Government.

That being so one cannot see why, in Assam, Government should give assistance to carry on experimental work of a somewhat similar nature. Cane growing tests have been carried out there and those in charge should now be able to give costs, cane yields per acre and cane analyses. It would seem that all that is required is that results be published and, if good, the rest left entirely to private enterprise. If bad then the scheme should be dropped.

In other parts where sugar manufacture has been established for years and it is simply a matter of following what others have done loans have been given.

When a loan has been given Government ought to retain the right to supervise the manner in which it is spent, otherwise one may have people practically ignorant of anything concerning the industry they propose to go into with Government money, spending that money on unsuitable plant or being induced to waste money needlessly on what they may be told are special processes.

In the case of sugar, Government have a sugar expert in their employ and it should be part of his duty to go over and compare specifications of machinery it is proposed to buy with Government money. This does not always seem to have been the case. The expert should also have returns of factory results, sales and such for his consideration, otherwise, Government may at any time be given into the hands of unscrupulous persons who may work for failure to buy in a plant at auction prices.

Industries are being started in India in comparatively small scale factories. Already, for example, there is sugar manufacture and refining and oil seed pressing and, in cases like these, it would be of great assistance to have a Government expert to advise on plant to be purchased, check results and explain where losses may be stopped. Most of these factories are too small to pay for highly skilled technical management, and as a result, work blindly and wastefully.

Industries in India, for the most part, must be based for many years on forest products, agricultural products, and such, and a board should be constituted capable of advising on these matters with a Director of Industries to carry on detail work. As so much would depend on the man chosen as director it is not easy to say if he should be a business man or have other training, but speaking generally, the man with a training, in chemistry and some engineering, and with a knowledge of industrial processes, would seem most suitable as he has the knowledge that should enable him to pick out the weak points of a proposition, work out probable costs, and know in what direction research is likely to be of value.

Any industrial research institution should be Imperial and take over work that is at present scattered among different departments.

It is the intention that this note should be confined to sugar and cane, chiefly in the United Provinces and that part of Bihar and Orissa north of the Ganges, and without going into lengthy detail, elaborating afterwards any part on which further information may be required. Note on sugar production.

Living in the jungles, it is not easy to get statistics and figures must of necessity be largely left out.

With the development of railways, alterations in the distribution of crops have taken place and one finds that districts are no longer self-contained in the matter of crops grown but tend to produce those that suit them best and import from outside materials that can be grown cheaper elsewhere. This is markedly the case in districts to the south of the United Provinces, and in the Central Provinces so far as sugar products are concerned.

With the completion of the Bengal and North-Western Railway the movement of gur—a sugar made by concentrating cane juice until it solidifies—became pronounced. For a time after the completion of the Gogra Bridge a sugar refinery in Cawnpore could depend on getting large quantities of a dry hard gur made up in the form of balls about three inches in diameter.

This ball gur came from Fyzabad, Busti and other parts of the country between Gorakhpur and Gondia, and about twenty years ago could be bought in Cawnpore at from Rs. 1-14-0 to Rs. 2-4-0 per imperial maund in normal years. Carters from the south got to know this hard gur and appreciated it for its keeping qualities in the rains and on storage. It also packed conveniently into bags, and, for small retailers in local bazars, the ball form was suitable as each ball was of approximately the same weight, so, when hawking gur about from one place to another the owner did not require to trouble about weights, knowing how many balls he had got for his money.

Carts coming in with cotton and grain to Cawnpore began to load this gur for their return journey, and for 15 years or thereabouts refiners have been unable to touch it; the price had risen to about Rs. 4 per maund. Even in years when there has been a glut of other gurs this ball gur has kept up in price.

In the country immediately to the east of the town of Gorakhpur, where formerly a soft gur, suited to the small country refineries, was produced, the making of ball gur has started because of the high price obtainable for it and because of the lack of demand for soft gur, many country process refineries having closed. This soft gur was made soft and of high water content because it had not to be carried any distance to the country refineries, of which there were at one time many and situated all over the area where this gur was made, also, in making it destruction of sugar was less, in that the rapid rise of temperature towards the finish of the juice concentration did not take place to the same extent as in a boiling to make a harder gur.

Towards Meerut and the north a clean light coloured gur is made with the sugar crystals in it very small and "smeary", not gritty. This brings a high price in the United Provinces as a food gur. It is fairly acid, and to get juice suited to making it, unripe cane is generally crushed—a wasteful process.

From a sugar making point of view this gur and the cane it is made from are of little interest. The yield of refined sugar from this gur could not be great and the country refineries using it were the first to feel the pinch of competition from refineries and factories working on western lines and making sugar that Hindus could take without prejudice to caste.

One result of the decay of the country refining industry was that molasses increased in a few years from about Rs. 0-9-6, per imperial maund to about three times that price, giving Java a market in India for molasses which, till then, had practically been a waste product.

In the east of the United Provinces and in Behar and Orissa north of the Ganges, most of the gur made is dirty and little care is taken in its manufacture, so its reputation from the point of view of the person who eats gur is low. It may easily average a content of from 5 to 7 per cent of cane chips and mud and individual pieces may consist of a dry clay centre smeared with gur on the outside. It has a high water content and consequently

is soft, and being soft, does not stand handling and does not store well. On storage it breaks up, molasses drains out, and generally, for direct consumption, it is a most unsatisfactory gur.

Markets like Cawnpore will not take it for eating purposes but picked lots go to the Bombay side of India and to the east of Central Provinces. In the east of the Central Provinces it is taken because of its low price and by poor people, and it is probable that that which goes to the Bombay side of the country is also sold to the poorest classes.

Why this low quality gur should be made in these districts is not easily explained but probably it is because a fair proportion of the gur of these parts has always gone to refiners and as the refiner does not eat it and in any case has to extract the mud, the cultivator probably got into the way of not being too particular and so helped out the weight and worked off his advances. The refiner, in turn, might not be too particular about accurate weighments.

These gurs, though dirty, have the highest sugar content of Northern India gurs, and so the machine using refiner—the successor to the country refiner—draws his supply of raw sugar from the districts producing them.

Their dirtiness prevents them from bringing good prices as food gurs, and so the refiner profits by the carelessness of the cultivator, who is, at the same time, the gur maker.

In turn, as the gurs do not bring the highest prices, cane is cheap, and partly because of this cheap cane and partly because it is obtainable in quantity and of good sugar content within reasonable distances, sugar factories have established themselves chiefly in the dirty gur districts.

In Gorakhpur district there were in 1914-15, 115,561 acres of cane in a total cropped area of 2,124,909 acres or 5·4 per cent. Of this cane, 52·6 per cent. was lightly irrigated from wells.

In this district there is one sugar factory at work capable of crushing about 350 tons of cane per day.

In Saran there were in 1915-16, 46,200 acres under cane out of a cropped area of 1,132,700 acres, or 4·07 per cent.

In Saran there are two factories capable of crushing, jointly, about 500 tons of cane per day.

In Champaran in 1915-16, 14,800 acres of a total cropped area of 14,01,500 acres were under cane or 1·05 per cent.

There are three factories in Champaran capable of jointly crushing about 750 tons of cane per day. One of these, however, usually works in the day time only.

In Darbhanga in 1915-16, 14,300 acres of a total cropped area of 19,09,500 acres were under cane or 0·74 per cent.

Here there are two factories close together in a tract in which cane is concentrated. They probably could crush 700 to 750 tons of cane per day.

In Gorakhpur district probably not more than $\frac{1}{10}$ th or $\frac{1}{20}$ th of the cane grown goes to modern factories, the remainder being worked up into gur.

Part of this gur is hard ball gur which finds a ready market and some is worked up into desi or country refined sugar. The refineries using machinery also draw most of their supplies from this district.

In Saran the two factories there probably take about $\frac{1}{10}$ th, or less, of the cane grown, the remainder going to make gur which is mainly in demand for refining and for export to cheap gur consuming areas.

In Champaran it would appear that from $\frac{1}{2}$ to $\frac{2}{3}$ of the cane grown goes to factories and here, with the exception of part of the north, cane growing has been concentrated and developed to some extent in the neighbourhood of the factories. In Darbhanga the factories seem to take about the same proportion of the cane as in Champaran.

In Darbhanga and Champaran any cane in excess of that taken by factories goes to gur making and small country refiners.

In the main, machine made sugar depends on Gorakhpur and Saran Districts for its supplies of raw material.

The cane grown in these districts ripens well and develops a good sugar content compared with other parts of the north of India, and, as the cane ripens, so the gurs made from it have a good sugar content compared with some gurs which at times, bring prices nearly equal to imported sugar. Thus, the cultivator who makes a clean gur from an acid, unripe cane and gets Rs. 5 per maund for it with a 10 per cent. extraction, is much better off than he would be if he attempted to make sugar for which he would probably get at times only Rs. 9 per maund, or less, on an extraction from his low quality cane of about 4 per cent. of sugar or thereabouts.

At present the areas in Northern India which grow cane suitable for sugar making are limited, and this is forgotten or not known to the journalists who bring out a stock paragraph each year, on the publication of the sugar import figures, commenting on the degeneracy of the Indian sugar maker and his antiquated factories.

The desi, or country sugar industry has had to go because of its small sugar extraction and high costs of production, together with the fact that caste prejudices could not resist cheap imported sugar, Indian factory and machine refinery sugar when crushed to resemble country sugar. The crushing of the sugar was an anaesthetic to the consumer's prejudices in the first place, but now he is getting used to taking foreign and machine made sugar and crushing is being reduced each year.

There are in India some as efficient factories as are to be found anywhere except that they might be better with more extended trains of mills.

It is difficult to see how India at present could make all the sugar it requires. Gur is the sugar for which there is the great demand in India. Refined sugar is, comparatively speaking, a luxury; gur is the food sugar of the country and this must be so from the manner in which the Indians take their sugar. Conditions are different from Europe. In Europe refined sugar is a necessity because it is seldom eaten as sugar pure and simple. It is used in jams, confections, baking, etc., and for these purposes a pure sweetness is required without any other admixture of flavours. In India sugar is taken to some extent in sweetmeats—that is where the country refined, factory, and imported sugars go to, but gur is taken as a finished article and the strong pleasant flavour of cane products fills the part which vanilla, or other flavours may take towards sugar in Europe.

To return to these areas in which the sugar maker may thrive alongside of the gur maker.

After deducting cane taken by the factories the production of gur for Gorakhpur and Saran districts combined should be approximately 170,000 tons per season, and, with the machine gur refineries which draw their supplies from these districts in full-operation these 170,000 tons would be reduced by 70,000 tons, leaving only 100,000 tons for country refiners, for hard ball gur which refiners cannot afford to buy, and for such markets as take low quality gur. There is at present no large margin in Northern India for the extension of the industry to supply India's refined sugar requirements. All the cane grown in Gorakhpur and Saran districts, about 1,600,000 tons, could quite easily be worked off each season by two companies such as the Cuban Chappara, and, from it, they would probably make about 122,000 tons of sugar. What sugar industry there is in Northern India is, it might be thought, in a precarious condition if it is dependent on the production of dirty gur in certain districts.

In case of the machine gur refiner this is the case, and it is into this industry that Indians have put the capital they have invested in sugar machinery solely because the first sugar refinery in Northern India refining sugar by a process not prejudicial to caste made a success of it. A moderately extensive movement for the improvement of Gorakhpur and Saran gurs might well put them beyond the reach of refiners as they only get the equivalent of from 4·4 per cent. to about 6 per cent. of sugar on cane—the amount depending on the efficiency with which the factory is managed. A factory working from cane may average 7 per cent. to 8 per cent. extraction.

The refiner gets a lower quality of sugar than the average of factory sugar made directly from cane, also, the sugar factory uses the crushed cane as fuel whereas the refiner has to use coal. In other ways the factory scores over the refiner. Starting with the cane juice the factory can treat it to best advantage. Gur cannot be brought back to juice conditions after the treatment it gets from the gur maker.

By storing gur the refiner can work all the year if he wishes to and so reduce costs, but a small additional expenditure on plant would allow of a factory working as a refinery as well as a factory and be capable of working with a higher efficiency than the average gur refinery.

The refineries, including one factory which works for some months each year as a refinery, are all small. The seven of them in existence have only a total capacity of about 70,000 tons of raw sugar per annum. This total would, in Europe, be regarded as an amount for a comparatively small plant to treat.

The sugar factories are also small compared with some in other parts of the world and it is questionable if the largest of them could crush, on an average, much over 375 tons of cane per day throughout the season.

They have been erected chiefly where there is some concentration of cane cultivation and in several cases at some distance from a railway.

The capacities of the factories situated at a distance from a railway are limited by the amount of cane in their neighbourhood and the land capable of growing it satisfactory, also by the carting capacities of the districts they are situated in.

It is improbable that in any district, and with due economy of carts, the carting facilities would allow of cane being brought in for more than seven or eight miles, so that, assuming that conditions are favourable, it is improbable that more than 300 to 350 tons of cane per day could be brought in.

In an extensive cane area the factory capacity might be increased by running out tramways and collecting to centres by carts but any such scheme would require that a careful survey of the carting power of the neighbourhood be first made and the tram lines arranged to utilize the available carts to the best advantage.

There is no cane area with cane plots of such an extent in Northern India that it would be worth laying a line in movable sections to the edge of the cane and only using carts for short collecting trips.

Cane lands are scattered, patches come in that are too low and flood in the rains, while other parts again are too high and do not hold sufficient moisture.

The cultivators also have small holdings of land and cane is one of their crops grown in rotation with others. Their cane is not grown intensively nor can a factory look to getting all the cane in a given area. The gur buyer also competes for it and comes early into the market, forcing the factories to start on unripe cane that they may get a season of reasonable length.

In the case of a factory situated on the railway the limiting factor is the cost of the cane and with careful and intelligent arrangements for cane supplies a factory should, if economically worked, be able to draw cane from about 40 miles on each side in a year when Java sugar, which rules the Indian market, is at bottom prices. In such a year sugar prices would be too low for the gur refiner to work profitably with gur at normal rates. If gur was below normal rates then cane would be obtainable at lower rates than has been taken for calculating purposes.

If the percentage of area under cane averaged the same as Gorakhpur district along a stretch of railway 40 miles on each side of a given point and three miles to each side of stations, and, if all this cane was sold to a factory, then, a plant to crush about 1,200 tons per day could be kept at work for 100 days.

It is improbable that all the cane could be bought, so that a factory to crush from 500 to 600 tons per day would probably be the most convenient size. If financial provision were made for bad seasons then the factory might be made bigger but possibly the railway company might have something to say on this point regarding wagon supply.

It has already been stated in this note that factories start in the beginning of the season on unripe cane. Much might be done to minimise this objectionable factor.

Towards March and April it is nothing unusual to have $\frac{1}{2}$ more sugar extraction on cane over that of the beginning of the season in December, with the same or lower working charges because of the increased purity of the cane juice. Every effort should be made to extend factory seasons into, or through, April. In well-grown canes, with the open trucks now supplied by the Bengal and North-Western Railway Company, there would be little deterioration in getting the cane from the fields to the factory. It is, in short, in ill grown cane that the heaviest deterioration takes place because of the undue proportion of cut ends to cane, and these short canes also dry out first in the field.

In Indian sugar factories three systems of sugar making are in operation, *viz.*, the defecation process, the carbonatation process, and the sulphitation process.

In the defecation process the juice is lightly treated with sulphur dioxide gas, milk of lime added to neutrality to litmus then heated to boiling, but not boiled, in "defecators"—vessels that are cylindrical in shape with a hemispherical double bottom for steam heating. By this treatment a thick scum of impurities is thrown up and floats on the hot juice by reason of its containing many small air bubbles. Technically this scum is called the "blanket" and the tendency of the "blanket" to break up as the juice comes to the boiling point, thus indicating that it has been heated sufficiently, is termed "cracking." These are old terms that go back to the beginning of Britain's connection with the cane sugar industry. The "blanket" contains the most of the precipitated impurities but some fall to the bottom of the defecator, on subsidence, after the steam by which the juice is heated is shut off.

In some countries phosphoric acid under various names is used to assist precipitation by the collecting action of the precipitated tri-basic phosphate of lime on light particles of impurities suspended in the juice, the lime being supplied by that added in neutralizing, or, by a little extra given to counteract the acidity produced by the addition of phosphoric acid.

In India the use of phosphoric acid is not admissible because of its possible derivation from bones.

Incidentally, be it noted that there is no particular prejudice against foreign sugar on which phosphoric acid has been used, as one Baniya said—"we don't see that, but if you use phosphoric acid we will see it."

After subsidence in the defecators a cock or plug is opened in the bottom of the vessel and the muddy juice allowed to run into a gutter set apart for it and conducting it to tanks in which a further subsidence takes place after heating. As soon as the defecated juice runs clear it is turned into another gutter and taken to the clear juice tanks, and, when it begins to run dirty again, owing to the "blanket" coming down, the juice, with the "blanket", is turned again to the dirty juice tanks.

The clear juice obtained on subsiding the dirty juice is mixed with the clear defecator juice and the muddy residue forced through filter presses.

The collected clear juice is again heated and boiled and any impurities rising as scum removed.

In Indian defecation factories Taylor filters are used to further clean the juice. In these filters it is passed through cotton bags enclosed in linen or hemp sheaths but this is by no means a satisfactory proceeding, because, to get efficient filtration large numbers of bags are required and they are an expensive item. Also, the juice is exposed to air in a thin film

over their outsides and over a large area, and with this and the heating, the juice goes acid with consequent loss of sugar.

The clear juice from the filters is concentrated in a triple effect, boiled to a mixture of sugar and molasses in a vacuum pan and the sugar in this mixture separated and washed with water or steam in centrifugal machines.

The final separation of the sugar remaining in the molasses is made by "jellying." That is, the molasses is concentrated in a vacuum pan then dropped into tanks in which the sugar is allowed to crystalize. This "jellying" is not a satisfactory process as it cannot be regulated.

It also produces a sugar for which there is little or no market, and so it has to be re-melted and worked up again, this involves a further loss.

In the carbonatation process the juice as it comes from the mill is made alkaline with lime, heated slightly only, and sent to tanks in which gases from a lime kiln are blown through it. The carbon dioxide contained in these gases precipitates lime as carbonate.

The action of the lime is partly chemical, but the main action is mechanical in that the carbonate of lime, produced from the excess of lime and the lime kiln gases, entangles gelatinous organic matter in the juice and permits of its ready filtration through filter presses.

The treatment with lime kiln gases is continued until the juice is only faintly alkaline, not neutral, else some impurities redissolve.

After pumping through filter presses to separate the carbonate of lime with its contained impurities, the clear juice is again treated with kiln gases, heated to decompose bicarbonate of lime, pumped through a second set of press filters then concentrated in a triple effect.

After concentration the juice is carefully but lightly treated with sulphur dioxide gas to decompose, or partly decompose, lime salts of certain organic acids which might otherwise give trouble in the vacuum pan owing to an objectionable property they have of being less soluble at a high temperature than a low temperature and so deposit on the steam coils and, without sulphur dioxide, these salts may stop the pan from boiling.

The carbonatation factories produce all their sugar in such a condition that it finds a ready market and no remelting is done. This is partly due to the clear juices given by carbonatation and also because of the use of a different sugar boiling system from that of "jellying" and in which crystallization takes place in the vacuum pan where it is under control.

The drawback to carbonatation is the cost of limestone and coke at the sugar districts. These are required for the lime kiln.

An attempt is being made to reduce these costs, and should it succeed there would be no doubt about carbonatation being the process best suited to India.

In the sulphitation process the juice is made alkaline with lime but not to the same extent as in the carbonatation process. The cold limed juice, or slightly warmed juice, is treated with sulphur dioxide gas from burning sulphur until neutral, heated to boiling, and the impurities allowed to settle out in subsiding tanks. The neutral sulphite of lime precipitated assists in carrying down the insoluble organic matters in the juice.

The clear juice is concentrated as in the other processes. Only one factory uses this process, and in their first two seasons they had troubles. Last season sugars were made without remelting which sold readily.

In the United Provinces determined attempts have been made to modernise the country sugar making industry by the introduction of improved boiling methods and centrifugal machines.

The attempt made by Mr. Hadi was the first, but before he started his work the country process was doomed and in Cawnpore bazaar only single bags of country sugar were being sold where formerly a hundred were sold.

Mr. Hadi's work showed the state of affairs and the hold cheap, clean sugar had got, but nevertheless, a small factory was set up at Allahabad Exhibition which contained no features that would assist to solve the small factory problem.

Again a small factory has been set up in Bareilly district and in it there does not seem to be much to lead one to expect that the problem is on the way to solution. It requires as much skill to extract the maximum of sugar from cane on the small as on the large scale and that has to be paid for, and it seems reasonable to suppose that if sugar factories could have got along with open evaporators, as in the Bareilly district factory, the old West Indian "copperwall" should have held its own, needless to say it did not.

So far the Bareilly district plant appears to have done an actual extraction of 3.61 per cent. of sugar on cane, but a balance sheet is shown based on a 6 per cent. extraction, the difference between the 3.61 per cent. and 6 per cent. being calculated on losses which it is hoped to obviate.

This calculated sugar yield is set down as selling at Rs. 13 per maund which looks like a War price. Factory sugars have touched 7-8 and 8 per maund in Cawnpore and it remains to be seen if they may not come down to this rate again when beetroot sugar re-enters the market in quantity and the increased production of other countries has to be disposed of. Cuba, for

example, had increased its output by about 500,000 tons at the end of 1915 from its pre-war output.

There seems little room for work in the direction of miniature factories.

There is scope for the small gur factory and this is a field that has scarcely been touched. A good cleaning process is desirable for the juice of small variety canes as these do not yield to treatment so readily as juices of well grown canes of the large varieties. Methods of gur storage would also require consideration, because, to get good prices gur must go on the market in an unbroken condition and dry.

The processes of clarification used in sugar factories are not admissible on juice to be used for gur making as the consumer is particular about taste and a certain amount of any materials added for clarification must remain in the gur. In sugar making, lime and such dissolving in the juice becomes concentrated in the molasses and do not affect the sugar.

The canes from which gur and sugar are made in Northern India are almost entirely thin or moderately thick hardy canes, but of late a Java cane has been tried in the United Provinces which has given good results.

Foreign canes should, however, be introduced with care and thoroughly tried under differing conditions of soil, moisture and climate. Experience in the Chanda district of the Central Provinces, where there is an intense dry hot weather—an extreme of Northern India conditions, has shown that many canes, though they may get an excellent start in February-March, get such a set back in May that in the end they give poor yields and become liable to disease. The wax on a cane seems to give some indication as to how it will resist a dry, hot climate. Red Mauritius cane, which has little wax on it, does very badly in the hot dry climate of Chanda and it is only by plentiful watering that any of it can be brought through May and this is not economical. It either dries completely, starting at the ends of the leaves, or becomes liable to the attacks of white ants, a sure indication that something is wrong. Pounda, with a little more wax on it, with care, goes through the hot weather and has the advantage of recovering rapidly in the rains, making a strong growth and tillering out in a remarkable manner.

Java 247, a cane with a heavy wax coating and a fair and even amount on the new cane where protected by leaves seems to stand hot weather best of all and with the minimum of irrigation water, but again, in the rains, and particularly in porous soils, it does not do well with long continued spells of cloudy, wet weather. In such weather the wet bulb thermometer in Chanda may range from 72° to 80°F and this gives a fair indication of soil temperatures in porous soils.

There is room for selection in seedlings and seedlings from crosses of indigenous canes. Climatic conditions for cane are not easy in most of India and the indigenous canes having survived though being best fitted to conditions, seem to offer a field of search for resistant canes rather than the offspring of foreign canes many of which, so far as seedlings are concerned, owe their existence to weakness in one parent.

There is a call from sugar makers in Northern India for an earlier ripening cane than the Hemja and Bhurli canes which they crush, but this condition might be difficult to attain.

Cane in non-irrigated areas in the sugar districts does comparatively little growth in the hot weather, then comes away rapidly when the rains set in. It is open to question if the process of sugar building in the cane can be forced by selection beyond its present limits.

Something might be done by the careful cultivation of ratoons of canes at present cropped. Ratoons are canes that grow in the second year from roots that have already produced one crop.

Much could be done to improve cane and cane yields by a system of supplying manure to ryots if one could get over the difficulty of dealing with many small cultivators.

It is not uncommon to see cart loads of cane at an Indian sugar factory varying from 6 inches to 8 inches to 2 feet long and some of it little thicker than a lead pencil. Such cane is fibrous and contain little juice, giving sugar returns of perhaps only 4 per cent. to 5 per cent. with heavy maceration in the mill. The same variety of cane, well grown, would go to 6 or 7 feet long and 1 inch to 1½" thick. In a factory in the cane districts there was an example of possibilities last season. The sugar extraction on ordinary average cane was coming out at about 7 per cent. to 7½ per cent. on weekly averages, then, as well grown cane of the same variety came in increasing quantities from an indigo concern the sugar extraction gradually mounted up until it stood at 10.1 per cent. on cane, declining again as the indigo concern cane decreased. Heavy manuring and intensive cultivation are not required, soil water conditions are not suited to these, but it should be carefully worked out on cultivators' lands what manure, and how much, is required to give cane crops of from 400 to 500 maunds per acre, and assistance given to the cultivators to help them to attain these yields. Something other than cattle manure is required as there is not enough to go round; oil cake seems a likely substitute.

Mr. Macdonald of Barah concern has got as high as 800 maunds of Hemja cane per acre on a small area without irrigation, and again without irrigation, has averaged 476 maunds per acre over 600 acres. A fairly good crop for cultivators may be taken at 250 to 300 maunds per acre, all on small areas.

In principle the ryot's system of cultivation is suited to cane requirements though improvements in detail might be possible.

There seems little to be gained by attempts to introduce planting systems borrowed from countries in which climatic conditions are entirely different to those of India.

Planting in trenches, for example, leaves a block of packed earth between each trench which acts like a wick and dissipates soil moisture from its sides and top. The evaporation from packed earth in places must be great as it is not uncommon to see, in certain districts, areas of packed earth that remain moist on the surface throughout the hot weather. Excessive evaporation also tends to "usur" formation.

The cultivators' system of planting cane on the flat gives the least area for water losses to take place from, and these water losses the cultivator minimises by making the soil surface into a dust mulch.

In the Central Provinces some experimental work on cane growing has been carried out by a small syndicate in connection with a proposal of the Government of the Central Provinces.

Land was given on ryotwari terms and it was stated that water was available for 1,000 acres of cane.

The idea was that with a considerable area of land under the control of a factory, and with a good supply of irrigation water available, intensive cultivation could be resorted to. Experiments have been carried out on manures. These were found to be necessary as land, such as this was, which had been a forest grazing area, did not behave under crops like land that had been in cultivation for a time.

Cane varieties were tested for their suitability to the climate, and contour systems of planting, to allow of efficient and economical irrigation, were worked out. Work in the meantime is practically suspended as the syndicate sees no prospect of development at present through the failure of the irrigation canals which water the lands. Needless to say a failure in the water supply was the last thing expected by the syndicate in a scheme that had been brought forward by Government. Though the tank has been in operation for several years, even now there seems to be no reliable data on leakage.

The fermentation and distillation of molasses for alcohol is regarded in most sugar-^{Fermentation and} producing countries as the chief means of disposing of what is sometimes a troublesome^{distillation of} product. In some countries, in which it has not suited to produce alcohol, molasses has been^{molasses.} burnt or allowed to run into streams.

In Northern India there is a large demand for molasses for mixing with tobacco, and with the decay of the country sugar refining industry there has been a steady rise in molasses' prices, and now, with molasses at about Rs. 2 per maund, Indian distilleries have little chance of competing with Java spirit in the open market as in Java molasses is a product of low value. The Indian distilleries in existence all depend on Government contracts to supply spirit for shops. These contracts put them on a better footing than they would be if left to the conditions of an open market, yet they do not make much of it owing to the high cost of raw materials. Several of the distilleries in Northern India use the Hansen pure yeast system for their fermentation and their yields are good. Distilling has little interest at the present high molasses' prices and beyond the demand for alcohol for consumption as country spirit, or for making up whiskies and such and also a little for methylating, there is little scope for alcohol production in India. There are no industries that use it to any extent.

Megass or crushed cane, as a paper making material has been tried in several countries^{Paper from megass.} but without any great amount of success. Processes for making paper material from megass have, so far, been based on boiling the megass with caustic soda solution. This is a drawback as in no cane-growing country is caustic soda obtainable cheaply.

Another disadvantage is that cane fibre is not a uniform material, consisting as it does of hard rind, fibre and pith and in treatment suited to the rind the pith is over treated and yields are small.

The cane mostly crushed by Northern India factories is a pithy, rather than a fibrous cane, which makes it even less suitable for paper material than canes crushed in some other country in which paper making has failed.

ORAL EVIDENCE, 4TH JANUARY 1917.

Mr. C. E. Low.—Q. What is your view of these small power mills for crushing cane without reference to sugar, to deal with the cultivators' cane and make gur of it?—A. I think the introduction of small power mills would be a good thing.

Q. What effect would it have on the location of the cane?—A. I think it would probably have a tendency to concentrate in the neighbourhood of small power mills.

Q. And that would help the introduction of cane factories afterwards if it was thought advisable to do so?—A. It would assist in that direction.

Q. Is the establishment of cane factories known to you in Bihar which are using sugar cane and not gur; has that tended to concentrate cane round those factories?—A. In the case of the Champaran Company it has. In the case of Marhowrah it has resulted in an increase of cane cultivation. In the case of other factories, such as Pussa, they replaced the old desi industry which was worked round about, and the arrival of such factories tended to stop crushing

of cane in cattle mills. Large factories could give probably better terms for cane than what the small crusher could do.

Q. What prices are usually paid for cane in the United Provinces factories, prior to the War, and within what limits?—A. From 3½ annas per maund up to 5 and 6 annas per maund. The general price would probably be about 4 annas per maund.

Q. The differences were due to what—competition from other factories or the price of gur?—A. Regarding the higher prices, the 5 annas and 6 annas per maund in the case of one factory, it was under a contract made to supply cane. The factory does not deal direct with ryot. In the case of another factory, which at times paid fairly high prices, they cannot get full supplies locally, and have to go outside for some distance. Supplies are obtained through contractors and agents.

Q. Practically the cost of carriage?—A. No. They have to go to districts, in which they are not in direct touch with the ryot and work through contractors and agents, and coming in without previous arrangement and when gur crushing is going on have to offer higher prices to induce cultivators to stop gur making and sell cane.

Q. Has any attempt been made in any of the United Provinces factories to buy on analysis?—A. Gur is bought on analysis.

Q. Not for sugarcane?—A. I once put forward such a proposal in Champaran, but the planters who supplied the cane in this particular case refused to have anything to do with such an arrangement. They thought that what they would rather have was a definite fixed increase of price for their cane, not on analysis and extraction.

Q. Do you know if the Rosa factory ever bought on analysis?—A. I don't know.

Q. Do you get any trouble in the eastern districts of the United Provinces and Bihar from pig?—A. A little, not very great; not to anything like the same extent as in the Central Provinces.

Q. Do you think if soft cane were put out pretty freely in the United Provinces that you will get trouble from pig?—A. I think you would.

Q. There are plenty of pig about?—A. There are pig about in fair numbers but not to the same extent as in the jungle part of the Central Provinces. A good lot would depend upon the cane. In the Central Provinces my fencing has been broken down once or twice. I found that pig came in and attacked the soft cane but left the harder cane. A pig's opinion of the cane indicates the quality of the juice and is almost as good as an analysis at times.

Q. Do the cultivators in Bihar or the United Provinces grow their cane in blocks?—A. No, not to any great extent.

Q. Perhaps not rigidly in blocks but fairly well in one part of the village with reference to the possibility of fencing?—A. It is scattered, as lands suit or individual cultivators think it would be, a crop to put in. They don't combine as the villagers in the Central Provinces do.

Q. Fencing would be a very doubtful proposition in the United Provinces?—A. Yes. In the United Provinces it would be a comparatively easy matter in the cultivating district to clear out pig almost entirely. Conditions are different in the Central Provinces. There is a certain tendency to preserve pigs in places in the United Provinces and Bihar which one does not have in the Central Provinces.

Q. How far is wire fencing efficient?—A. Barbed wire, single wire, has little efficiency. Ordinary wire fencing has little efficiency. Wire fencing with vertical stiffening wire is efficient, but a great lot depends on the fixing of the vertical wire. In one type of fencing I have had, the vertical wire is just brought down and given a hitch round, and a twist like that (the witness indicates with his hands). The pig forces his head between the horizontal wires which are about 1-8 inch in diameter. This opens the vertical wire knot and he can then spread the horizontal wire and push through. In another type of fencing, where it is a piece of wire wrapped round the vertical and horizontal and twisted, that holds fairly well. I should think that the new fencing that has been put on the market, in which the vertical wire is fused on the horizontal wire would be most efficient.

Q. What does it cost per acre to give a fairly efficient fencing?—A. Before the War you could reckon on fencing averaging about 5 to 8 annas a yard. You have very considerable variations in the prices according to height, make, etc.

Q. At what price could Java sugar be delivered in Calcutta before the War?—A. I think you might take as a safe figure for the ordinary Java Raws about 5 Rs. a maund and still allow of the average Java factory paying at least about 5 per cent. interest on capital.

Q. What sugar is that for?—A. For the ordinary 16.

Q. Of course it is generally considered that for sometime after the War freights will remain fairly high?—A. I think so.

Q. Will that continue to afford a reasonable amount of protection or could Java reduce her prices so as to make up for that?—A. I don't think so. The cost of production in Java is on the increase; the land rents are going up and the labour rate is going up as everywhere. Before the War the tendency was towards an increase of price.

Q. In a place like the United Provinces or Bihar, supposing Government could only keep a single expert, do you think they should keep an expert to advise the existing large factories,

or do you think they should concentrate to help the small ones, supposing they could afford only one man?—A. With the large and the small factory the principle is the same, and I should think that it would be possible for the expert to assist both. The small man, the refiner, is at present losing in that. He cannot afford to pay a well trained man to manage his factory, so he has a man who has a certain smattering of knowledge and who can put sugar through in a way. He may not be in a position to do accounts work, and check his own yields. These are the people most in need of assistance. In the matter of plant it really wants advice or a report to be given once, and that sets thing right once for all so far as plant is concerned. Any lapse in methods of working can be at once got at if returns are sent in. I had a case where I did some consulting work for a Mahomedan who had got a small sugar factory. His returns were not good, 35 to 40 per cent. of sugar on jaggery, and his plant was fairly good. He was not limited by inefficient centrifugal machines. The mistake was entirely in the method in which he was boiling his sugar in the vacuum pans and on altering the system of boiling, he got up to 50 per cent. sugar on gur. Since then he has had trouble with his men and the new arrivals require selling right. An expert could arrange to train men so that a supply of men knowing the best methods would always be available.

Q. Is much done by the Government expert in the United Provinces in advising the small refiners?—A. The Government expert has done, I believe, some work for a factory in the United Provinces, not so far as I know for refineries. I have not heard of his giving advice to other factories.

Q. Do you think that it is worth Government's while to devote much attention to these small refineries, or do you think that they are likely to disappear?—A. I think the position of the refinery may become precarious, but it would be a good thing, I think, to keep them going on as long as possible, because it has brought a certain amount of Indian capital into the industry, and, by and by, I think, possibly after the War, as they have accumulated a little spare capital, you may find a tendency among them to go in for cane crushing.

Q. How can Government help them best—by having some body to look over their plants?—A. I think by giving them advice in working, looking over the plant and checking their output.

Q. You take this position as regards the small refiner; you would help him with expert advice and pave the way for the bigger man buying the small cane crushing factory?—A. Yes.

Q. Is there anything else that could be done in regard to the bigger concerns, or are they able to look after themselves?—A. I think some of the larger concerns would be glad of expert advice; for example, last season the factory which I was in charge of averaged a little over 8 per cent. of sugar on the cane, and our nearest neighbours working practically the same cane got under 6 per cent. of sugar extraction. They gave out no definite figure, however, for extraction. It is a factory crushing about two hundred tons of cane a day. They, I think, have been in fear of some of their neighbours. They had been doubtful about what is the right plant, the right processes, and about being able to work on the right process when found. They grudge the paying of a man perhaps 8 or 12 hundred rupees a month to run their factory as it is a heavy burden on a little place to pay such a salary. A Government expert would be of great assistance to such places, and there are 3 at least in the United Provinces and Bihar. In the case of the larger factories, of course, they made a very good start, as for instance the Champaran factory and Marhowrah factory. The matter of processes for these factories was thoroughly gone into in the laboratory and experience obtained on boiling and treating low quality raw sugars taken full advantage of and applied to cane juices which, at times, are not good.

Q. Suppose small factories were given the help of competent advisers to tell them how to start and see them once or twice when they were going on; do you think that a small factory like the one at Bareilly would prove a success?—A. What amount of cane does it put through a day? I suppose about 150 tons. In any case, quite apart from quantity crushed by putting in suitable plant you could get the same percentage extraction of sugar as any of the larger factories with equal quality cane. The larger the quantity of cane crushed the more working costs would be reduced.

Q. Referring to the Government experiment, that is not an economic proposition?—A. No.

Q. What do you think is the smallest economic proposition?—A. At least 200 to 250 tons of cane a day.

Q. That means about a lakh of rupees?—A. Considerably more than that. To put in a plant that would give you good extraction it would mean that such a plant would probably cost before the War at least 2½ lakhs.

Q. But that is not what I meant by a small factory?—A. The very small factory is not an economic proposition.

Q. That is for making sugar from cane?—A. Yes. The 3,600 maunds of sugar proposition would not pay on account of the cost of supervision, do you mean on itself?—Not altogether on account of supervision, but of the difficulty of arranging any plant on such a small scale. When you come down to a toy plant, almost laboratory plant, it means that the cost of the

plant per unit of sugar goes up enormously as compared with big plant. Supervision and skilled labour charges would also tell heavily even with a government expert to assist free of charge.

Q. What is your view of the future of gur in this country; do you think people will continue to eat a good deal of it? Would it continue to be in good demand?—A. I think so. I think that the demand for gur will continue.

Q. How far is the price of gur affected by the price of sugar?—A. It is little affected in normal times.

Q. The price of gur is more affected by the nature of the season?—A. Yes. Much more.

Q. I sent you privately certain figures showing the way in which the sugar companies were run. Up to 1910 or 1911 they were doing quite badly for 4 or 5 years, and since then, before the War, they were doing a good deal better. Have you formed any opinion as to what the change was due to, whether it was improved administrative management, or improved technical management, or the price of sugar, or the price of gur?—A. There has been little alteration in the technical management and little alteration in the plant. The variations were due to a series of lean cane years and good cane years and to sugar prices (not gur) taken along with these.

Q. They did not get enough cane?—A. They did not get enough cane at times and the gur manufacturer competes with all those sugar factories for cane.

Q. He could afford to pay as high a price as the sugar manufacturer?—A. Yes. In a short crop the price of the gur will go up; it is not necessarily so in the case of sugar. You might have a short supply of cane and sugar from Java and run sugar prices down to 7 or 8 rupees a maund up-country.

Q. There was a very short beet crop in 1911-12. The price of sugar rose very little, yet apparently the factories made bigger profits?—A. I think if you got the full figures you would probably find that towards the end of that year there was a substantial rise in the price of sugar. Until the failure was known in August or September, sugar prices kept down, and also in that year I recollect there was an extraordinary cane crop; in fact the cane was burnt on the fields. One factory worked right up to the end of May in the following year. Jaggery was down to about 2 Rs. a maund or less. The failure of the beet crop coincided with an extraordinary cane crop in northern India.

Q. Is cane grown with irrigation in the Eastern United Provinces and Bihar?—A. There is a little irrigation from wells.

Q. Is it general?—A. No. In the Gorakhpur district about half the cane is irrigated from wells. That only means perhaps one, two or three waterings in the whole season.

Q. Do you know anything about the cane grown by irrigation in other parts of the United Provinces further north?—A. In Cawnpore and round towns a considerable amount of big cane is grown under heavy irrigation for chewing.

Q. The kind for gur or sugar making is not grown much under irrigation?—A. Not much, not to the same extent as in the east of the United Provinces where there are no canals.

Q. You have not seen any part of the United Provinces where it is?—A. I don't know the western districts of the United Provinces well. It is grown on the Ganges canals. But again, it is not heavy irrigation that is used for cane grown for gur making. The cane that is grown for gur making is invariably a small hardy cane and it probably is given some irrigation before the rains set in. The big cane grown for chewing is irrigated thoroughly.

Q. You don't know whether the United Provinces Irrigation Department are prepared to give much more water?—A. I understand that the Ganges canal water is pretty well utilised.

Q. The very important thing is to improve the quality of the cane; what prospect is there of doing that without much irrigation?—A. I think there are good prospects of doing so.

Q. The present yield is about 9 tons; do you think you could see your way to 15 or 20 without any more irrigation than at present?—A. 20 would probably be difficult and only attainable locally. I think 15 is possible.

Q. Does that mean more manure?—A. Perhaps an expenditure of about Rs. 30 per acre on manure.

Q. Better cultivation as well?—A. Similar cultivation to what the ryots do at present. I think the cultivation is well suited to the conditions.

Q. What extraction do you think small power mills for gur would give under United Provinces conditions in terms of weight of juice and weight of cane?—A. With the three roller mill with the ordinary gur making canes I do not think you could look for very much more than perhaps 55 to 65 per cent.

Q. And say with the six or nine roller?—A. Then you would go up considerably. You might go up might to 65 or 70 with maceration.

Q. I refer to present United Provinces conditions. How much would a six roller mill and an engine to run it cost?—A. To do how much, 10 tons a day or 20 tons a day?

Q. I was thinking more of keeping the cost of the plant within economic limits from the difficulty that people would find in financing it?—A. I have had no large experience in

small units (but I think a six-roller mill might be put down for perhaps Rs. 9,000—Rs. 10,000 with engine and boiler which would do 20 tons of cane per day.

Q. The point is if you can get something costing between 5 and 10 thousand rupees it would not give you a very much bigger percentage of extraction, but you would turn out a proportionately large quantity. Is that not to the man's advantage?—A. It is, and to do away with bullock mills would be an advantage as they are hard on cattle. Then, the bullock mill at work on experimental farms, with strong well-fed cattle is a very different affair from even a similar mill in the ryot's hands. His cattle are often small and his mill is opened out to fit the strength of his bullocks—his bullock power compelling him to disregard juice extraction.

Q. Do any concerns which you know about grow their own cane to any extent?—A. Not to any great extent. Japaha, I understand, grows a fair amount.

Q. What proportion?—A. I have no idea.

Q. Besides Japaha there are more concerns running in connection with indigo concerns where these factories supply cane?—A. In Barah factory, which is in the neighbourhood of a sugar factory, I imagine that the cane cultivation is about 5 or 6 hundred acres. Also at Purtabpore, Bubnowlic and Pursa cane is grown for sugar factories with which the indigo concern is connected.

Q. Is it usually found advantageous for sugar factories to do that?—A. It has this advantage that if a sugar factory has sufficient land for growing a reasonable amount of cane, they are not so liable to get caught by combinations of cultivators against them.

Q. What do you suppose an indigo concern ought to be able to grow per acre of cane in Bihar?—A. Mr. George Macdonald, who is a very careful planter, gave me some figures of his cane. It was 476 maunds per acre that he averaged over a 600 acre cultivation.

Q. The United Provinces conditions were not quite so favourable?—A. In the United Provinces, so far as the established sugar factories are concerned, the conditions are approximately similar, to those of Saran and Champaran.

Q. Turning to the question of starting cane factories and plantations in new areas, of course conditions vary a good deal. But what does it amount to for labour, per acre, for the first, second and third year, until you get it going and after you get it going?—A. Cane requires a varying labour force. From the end of the planting until the next season, one does not require a cooly per acre, perhaps a cooly per 5 acres per day will do. But when it comes to the cane being ripe, one is cutting, manufacturing and planting, all at the same time, so that for 4 or 5 months one wants a very big force, which will vary very much stripping for instance in the Central Provinces where they are unused to that work requires 3 or 4 times as many coolies, for a given amount of work, as would be required in Gorakhpur or Saran districts.

Q. You have had some experience of sulphate of ammonia for manure; have you tried it in the United Provinces or only in the Central Provinces?—A. In the Central Provinces. I tried it in the United Provinces a number of years ago.

Q. Under what circumstances can it replace bulky organic manures?—A. In soils in which organic matters have been concentrated and well brought up. Under such conditions sulphate of ammonia would probably be a useful manure. The use of sulphate of ammonia, on some of the soils in Central Provinces, as we have also to use superphosphates, would have to be watched as it has a tendency to create acidity in the soil.

Q. What about the United Provinces and Bihar?—A. As far as I recollect, our trial with sulphate of ammonia gave little advantage.

Q. Did you try that with cattle dung and oil cake?—A. We tried it against oil cake and filter press cake containing $\frac{3}{4}$ per cent. of nitrogen. The press cake and oil cake gave better results.

Q. Did you try it in combination with it?—A. Not in the United Provinces. In the Central Provinces I have tried it with oil cake. In the Central Provinces we have dropped sulphate of ammonia and also dropped nitrate of soda, because oil cake is so much cheaper per unit of nitrogen. It also contains valuable organic matters and phosphates.

Q. You don't think that sulphate of ammonia would come in much until you had thoroughly cultivated land?—A. I don't think so.

Q. These conditions do not exist in Bombay?—A. Beyond a visit now and again I have no experience of Bombay. They appear to use heavy dressings of organic manures at times on cane and with this sulphate of ammonia probably would give good result also in the United Provinces if organic matters were used in quantity. You have considerable differences in the soils of Bombay and the United Provinces. In soils with much carbonate of lime as in the United Provinces there is a tendency for organic matters to go out rapidly. If you could work a system like what is being done in some indigo concerns where they grow green manures and work your ammonia sulphate along with that then there are possibilities. The Indian cultivator uses no sulphate in the United Provinces. The European cultivator is, you might say, experimenting with it.

Q. Do you think it would be advantageous to get them to use oil cake in the United Provinces?—A. I think it would be of great advantage.

Q. In order to get them to do so do you think any assistance from Government is desirable?—A. Yes, assistance and demonstration.

Q. I mean apart from the ordinary methods of the Agricultural Department, such as demonstrations, and a certain amount of takavi leading up to assistance from co-operative societies; do you know what the Japanese did about artificials; they gave a free grant of a certain amount of artificials to the cultivator who was growing cane, provided he spent so much himself, and they saw that he did it?—A. The Japanese use high-handed methods at times.

Q. You mean there might be some difficulty, supposing you gave the fellow free artificials, in securing that he spent his share of it?—A. In India one should give them the manure, not the cash, and show them how to put it in the soil.

Q. That would be done in any case?—A. Also you would have to be fairly sure that the cultivator would not use the cake for cattle feeding, if you supplied him with castor cake or a castor cake mixture this would ensure it being used as manure.

Q. Supposing you gave the fellow so much cake per acre, on the condition that he bought so much more from you?—A. All those men are very small cultivators; they are mostly in debt and they are conservative in their ways, and it would be difficult to get them to put down money. If you gave the oil cake as an advance, that would be safer.

Q. You could give him so much manure per acre, and he would pay you back whatever portion was represented by takavi?—A. Yes.

Q. What is the rotation of cane usually practised in the United Provinces and Bihar by the cultivators?—A. I do not know that there is any particular rotation.

Q. He does not put in cane two years running?—A. No. They allow about 3 or 4 years between cane crops.

Q. Cawnpore runs a distillery plant?—A. Cawnpore runs a distillery plant and at Marhowrah there is also a distillery. The Cawnpore plant in part was originally designed to remove the invert sugar from molasses. Both distilleries work on the Hansen pure yeast system.

President.—Q. In regard to the kind of Government help that should be given to encourage the sugar industry in the country, so far as I can judge, in order to deal with sugar problems we have to take into account agricultural conditions, use of fertilisers, nature of soil, the disease of sugar-cane, etc., so that in problems of that kind a certain knowledge of local agriculture will be necessary. Botanical problems, selection of breeds suitable for different areas and soils, question of sugar engineering, methods of manufacture, questions of utilisation of alcohol and bye-products require a good deal of chemical knowledge; these will all be taken into account with local knowledge of holdings, methods of labour, etc. Taking all those problems into consideration, we have scientific questions like those of agriculture, botany, engineering and chemistry. I understand at present there is one Sugar Engineer for the United Provinces. He cannot be an agriculturist, botanist, chemist and engineer. I don't know what a sugar expert is in fact. It is quite obvious that no one person in one province can tackle all the problems in that province much less in India. What we want to know is what kind of Government organization is necessary and would pay the country to maintain for the purpose of improving the development of the sugar industry in India. I should like you to turn over these ideas in your mind and give us some idea as to what Government organization is required to tackle all these problems?—A. I shall do so.*

Hon'ble Pandit M. M. Malaviya.—Q. You say that "one result of the decay of the country refining industry was that molasses increased in a few years from about Rs. 0-9-6 per imperial maund to about three times that price, giving Java a market in India for molasses which, till then, had practically been a waste product." Do you think if permission were given to make alcohol, these refineries would have done better?—A. I don't think there would have been a market for all the alcohol that the molasses would have produced. The market for alcohol in India is limited.

Q. For what purpose is the molasses imported from Java used?—A. Mostly for mixing with tobacco; some for distillery.

Q. Don't you think there is need for industrial alcohol to a large extent in this country?—A. There are so few processes at work in this country in which industrial alcohol is used, that it is difficult to say. There are no industries that I can think of that use alcohol to any extent in India.

Q. Do you know how much we import in the shape of cements?—A. I don't know the figures.

Q. Don't you think that we can use all the industrial alcohol we might produce for making our own cements, paints and varnishes and for other purposes, both industrial and domestic?—A. I take it that by cements you mean those cements used for sticking things together, not Portland cements. For varnishes there is a certain amount consumed but it is only with the spirit varnishes, lac and such like, that alcohol is used and usually if a carpenter makes a door he buys some shellac in the bazar and mixes it with spirit and uses that as a varnish. For

* *Vide* additional written evidence printed after oral evidence.

the higher qualities of varnish fusel oil is used, because some of the resins used in the higher qualities of varnish are more readily soluble in fusel oil than in alcohol. For paints one does not have alcohol coming in to any large extent.

Q. Putting aside the question whether it could be consumed in one direction or in another, do you think that if permission were given to these refineries to make alcohol, that would help the industry to compete with Java?—A. I don't think so, because Java is sending in alcohol. Molasses is a product of much less value per maund in Java than what it is in India.

Q. Alcohol coming from Java is consumed, yet you don't think there is much scope for the consumption of alcohol which might be made here?—A. I think if one put the distillery here and in Java on the same basis, and do not give the Indian or Java distillery any special advantage one would find that the Java distillery gets its raw material and molasses so cheaply that it would be able to kill the Indian distillery. Before this molasses market came along, with an increase in the price in India, Java had difficulty in disposing of molasses. In India there is a demand for molasses at a good price, which puts the distillery here at a disadvantage as against the Java distillery which gets its molasses at a low rate.

Q. You say that the areas in northern India which grow cane profitably for sugar making are limited. Don't you think that the area could be increased profitably?—A. A considerable increase could be brought about on lands at present under cane by manuring.

Q. In your opinion that is the only thing that can be done in the way of increasing the production of cane?—A. That would increase the yield per acre. In all cane districts consideration must be given to the area necessary for growing food crops. These are things that will balance each other.

Q. Without extending the area, you think that there is a room for increasing the yield per acre by manuring?—A. I think there is room.

Q. All over northern India?—A. Yes. Increase of yield per acre is the important consideration and the improvement of gur making. In Northern India there is gur sold which is made from unripe cane. The question of gur has been neglected. To make this jaggery sold so largely in Northern India, unripe cane is cut. By cutting unripe cane it has not come to its full development in sugar and there is loss. But, if the cane were allowed to ripen, they could not make this "smeary" jaggery. It would crystallise. The jaggery question deserves serious consideration, and we should not look upon it as of no account, because it might be possible to allow canes in northern India to become fully ripe and develop the maximum of sugar and still make this "smeary" jaggery the markets require by altering the process.

Q. You don't think there is much room for bringing a larger area under cane cultivation without entrenching upon the area which should be left for food crops?—A. I don't think there is much room.

Q. If manure is applied to sugarcane why not apply it to other crops as well?—A. Then the food crop yields are increased. It is then a matter for the cultivator to consider how much more land he can give to cane profitably. Manuring for cane and good cultivation would favourably effect crops following.

Q. You say that the desi or country sugar industry has had to go because of its small sugar extraction and high cost of production? Have you any remedies to suggest for these two?—A. I am afraid it is in the position of small industries everywhere. It is not only in India that small industries have had to go.

• Q. Just think of the situation. The people who grow cane want to convert it into gur or sugar and they consume it; therefore they produce the article and have a ready market at home. Don't you think that they should be able with a little more expert advice to produce cheap and good sugar and compete with foreign sugar?—A. I think it would be difficult because of the matter of plant for sugar making. The taking out of the first 5 or 6 per cent of the sugar on cane is a simple matter. The real skill in running a sugar factory comes in when the last possible sugar is to be extracted. It is really a matter of the plant and one can hardly conceive of vacuum pans and such being designed to produce a few maunds of sugar per day economically.

Q. You say that "when beetroot sugar re-enters the market in quantity and the increased production of other countries has to be disposed of, it remains to be seen whether factory sugars may not come down to R7-8-0 and R8 per maund." Have you any remedy to suggest to meet that situation?—A. The improvement of the factories, the improvement of cultivation and in time improved varieties of cane.

Q. Those are a variety of conditions which would not be easy to establish at once, but you think that with those conditions established, Indian sugar could compete with foreign sugar?—A. Certainly, I think so. In another part of my note I have gone into that broadly, but not in great detail. Indian sugar could hold its own against Java.

Q. While the conditions that you have recommended are being established, would you give some artificial help to the Indian industry against foreign competition?—A. Artificial help in what way?

Q. Any other artificial help?—A. In what direction? Unless with advice and with checking of the work, suggesting improvements in plant, I don't see what else could be done.

Q. You say there is scope for the small gur factory and that this is a field which has scarcely been touched. You are quite clear in your mind that the gur factory can survive this foreign competition?—A. There is no foreign competition with gur.

Q. There is no competition with gur?—A. No. Java had considered it at one time but the difficulty was the question of exportation. To get it here in good condition is not easy.

Q. You say "there is no large margin in northern India for the extension of the industry to supply India's refined sugar requirements." Of course subject to the modification you have made, do you know if there is room for extension in parts other than northern India?—

A. In northern India there is a possibility of extension in the Terai. While in Cawnpore we did a certain amount of experimental work in the Terai. The climate is a difficulty there. Very fair cane can be grown in the Terai but there is a certain amount of rough rice cultivation, for which water is held up in the rains. When this water is held up for rice it floods cane. That is a matter of arrangement and selection of suitable lands. There are possibilities for cane growing in the Terai.

Q. Apart from northern India do you know of any other portions of India where there is room for more extension?—A. I have tried in the Central Provinces. I believe there are possibilities in Assam.

Q. And Madras?—A. Madras, I don't know. I have never been there except on the West Coast. There might be some small openings on the West Coast, but the labour conditions are bad. The room for advance is the increased yield per acre to be obtained by growing larger crops and better extraction of the sugar in the cane.

Hon'ble Sir Fazulbhoj Currimbhoy.—Q. Don't you think if large refineries were started it would be very difficult for them to get their raw materials, because the land is in so many small holdings by cultivators?—A. There is difficulty in getting the cane. It is grown in small patches. It is largely a matter of organization.

Q. Don't you think that if large factories were started, the cultivator finding that he would have to take the sugar from them, would charge exorbitant rates so that the factories would not be able to work with profit?—A. There is always a possibility of that, and that is why some factories safeguard themselves by putting a certain amount of land under cane.

Q. Do you think that if the Government under the Land Acquisition Act acquired some land, say 500 acres, and allowed a factory to take up that land and to have their own cultivation, that would prove more successful?—A. It would require about 1,000 acres before one could work a factory economically and then only by good cultivation and scientific manuring.

Q. That would be a very small factory. The output would be so small that the cost would be higher?—A. In the Central Provinces we were reckoning on growing up to 40 tons per acre of cane, 1,000 acres giving 40,000 tons of cane. With 1,000 acres at 40 tons per acre, that gives us 400 tons of cane a day for 100 days. This would be a fair sized factory.

Q. Do you think that labour here is costlier than in Java and Formosa?—A. I don't know Java and Formosa.

Sir D. J. Tata.—Q. Can you tell us what are the possibilities of date sugar as against cane sugar? Have you given date sugar any consideration?—A. About 15 or 16 years ago I had a certain amount to do with date sugar. It, I think, is a small man's industry on account of the difficulty of collecting the juice for large factories.

Q. Was there not in Eastern Bengal a date sugar industry at one time which was a fairly flourishing one?—A. Yes, in looking through some papers I came across a note which had been made out by the late Mr. Noël Paton. Date sugar production according to this note has been a diminishing quantity. In 1902-03 it was 143,000 tons. In 1910-11 it was 66,900 tons. That, I imagine, is due to foreign sugar competition.

Q. Could it not be better developed as a small industry?—A. I think in date sugar there is a possibility of improving the extraction, and Mr. Annett has done work in heating the juice in the same way that they do in southern India with Palmyra juice. All that is in the direction of improvement. The processes that were in use in Jessore for extracting sugar were very crude even in the factories owned by Europeans.

Q. You mean to say the manufacture of date sugar has not been studied as much as cane sugar?—A. No, because it was a small industry.

Q. Does not beet sugar, weight for weight, contain less sucrose than cane sugar?—A. In the case of a well refined beet and cane sugar one cannot by any chemical test tell the difference, but a semi-refined beet sugar is objectionable because it smells, unpleasantly. Semi-refined cane sugar, on the other hand, has a pleasant smell and the action of the invert sugar and salts contained in it on the palate give it an exaggerated sweetness, so that it is apparently much sweeter than a completely refined sugar either cane or beet.

Q. Is beet sugar very injurious to health as compared to cane sugar?—A. An agitation on this point was conducted in England by some doctors. Certain diseases, they said, were intensified by beet sugar, but I don't think this was demonstrated.

Mr. A. Chatterton.—Q. Can you say from your own experience that sugar is replacing gur or merely supplementing the supply?—A. Supplementing the supply.

Q. If we could increase production of gur should we be able to drive back the import of sugar?—A. The difference in gur and sugar consumption is gur is taken as a food stuff, sugar

is a luxury taken on special occasions or by the richer classes. Increasing prosperity of the community might be expected to result in an increased consumption of both gur and sugar.

Q. In attacking the Indian sugar problem is it not advisable to turn our attention more to the improvement of the indigenous process for making gur, rather than to attempt to introduce large factories for the manufacture of sugar?—*A.* I think so far as northern India is concerned gur and sugar are fairly well separated. In the districts where factories are sugar was formerly made to a certain extent. In other parts of India, further north, I think gur has always been more the product and by improvements there you can increase gur. There is a certain amount of division between the jaggery and sugar making parts of northern India.

Q. Would you be prepared to subscribe to a statement like this, that the Indian cultivator burns one third of his sugar to make the other two-thirds into gur?—*A.* I quite believe that he does though it is a difficult thing to get accurate estimates. The cane comes out of cultivator's mills partly crushed and he has to dry the megass before burning so that he does not even utilise the contained sugar to boil his gur. It is lost by fermentation in the process of drying the megass.

Q. Have you any experience of gur in the United Provinces?—*A.* I have watched the process in the United Provinces and have made it in the Central Provinces.

Q. At present the cultivator makes his own jaggery; do you think it would be a sound system to separate the manufacture of the sugar from the cultivation of it?—*A.* That is putting the gur factory into the same position as the sugar factory. There is no reason why it should not be done. If it can be demonstrated that a small central gur factory can be put up and made a paying proposition, capital would come in.

Q. Have you any knowledge of the factory which has been erected near Gorakhpur recently for the manufacture of gur on a fairly large scale with modern appliances by steam heating?—*A.* I saw the plant. It was not working. It was in process of erection when I saw it.

Q. The problem that we have got to tackle is somewhat in this way. The cultivator grows very small patches of cane and it is difficult to collect enough cane to establish a big sugar mill. It is possible in a great many places to collect enough cane to establish a small gur factory. When you establish the small gur factories there is a tendency to concentrate on cane growing in the neighbourhood, and the necessity to burn crops of cane in a good season does not occur. Formerly in the south of India they had to burn whole crops. That is a not uncommon occurrence in any good season. It is possible then by methods such as have been adopted by these people who put up improved gur factories, to get a better class of jaggery manufactured than is ordinarily manufactured by the ryot. Directly the cane crop comes on the market the price of jaggery drops, because the ryot having made his jaggery in a form that would not keep for any length of time, has to get rid of it?—*A.* We have considered these points in the Central Provinces because we had thought of going on there and making jaggery on a fairly large scale. Some very close consideration would have to be given to the methods of storage, because jaggery, in order to fetch its best price, must go on to the market in perfect condition. When packed or stored in bulk it breaks up, and the value falls. Also in the rains it absorbs moisture and gets damp and thought and consideration must be given to the problem of both making and storing by any one who hopes to make a satisfactory jaggery on a large scale and market it to best advantage. Too little attention has been given to these points.

Q. Is it practicable to make jaggery that will keep hard throughout the year?—*A.* No. Any jaggery will deliquesce during the rains if exposed to a rainy season atmosphere; even pure sugar will get moist during the rains. Much might be done by considering methods of storage. I have known jaggery selling in Bombay in September at a better price than Cawnpore sugar.

Q. Then it is not at all uncommon that the price of jaggery should be as high or higher than sugar?—*A.* Good quality jaggery. Before the War there was an industry going down Bombay way of mixing Java sugar with molasses to make jaggery.

Q. You agree in any scheme we have for improving the manufacture of jaggery that these arrangements for storing jaggery should be very carefully gone into, so as to hold the crop for a longer time?—*A.* Yes, also the methods of clarification of the juice, if one is after big extraction by increasing milling power.

Q. As regards machinery for the small factories, would it not be better to use five-roller mills instead of six?—*A.* A well arranged five-roller mill considering cost would probably be better than a six roller mill. An eight-roller mill would be better still. Cane put through might be practically the same in quantity but the milling would be more efficient. The suggested increase of roller capacity in mills is not so much with the idea of getting a bigger amount through the mills but to get increased extraction.

Q. For a gur factory, a 12"/18" roller is about as large as it is convenient to go into. Would you advocate using an eight-roller mill for that size?—*A.* Yes. My experience of cane milling with the horizontal mill is that the first set of rollers is largely preparatory.

Q. Is it possible in the north to extend the length of the planting season, so as to get a longer season for milling your cane afterwards?—*A.* The season from climatic conditions is

limited, but with more cane available than is usually the case and good means of treating it, the season could be extended beyond that usually worked. The season might be extended in factories by giving cultivators special terms for cane kept late, otherwise they would want to clear their lands.

Q. Have you formulated any reason why cane cultivation is so scattered?—A. Cane is grown with many other crops, and by men who control only small areas of land. Each man has his own idea of what crop it will suit him to grow. All lands are not suitable for cane.

Q. Ordinarily, is not the cane crop rather more profitable than other crops?—A. It is usually a profitable crop but much depends on the cultivation and manure the cultivator can give it. Another advantage is that cane is in the ground where there are few other crops and the cultivator can get money advances on it to carry on with.

Q. There is considerable reluctance in Southern India to the ryot growing a considerable amount of cane; is it due to the difficulty in financing the crops?—A. It is possibly due to the market conditions. If they increase, jaggery falls to a price which they would lose money at. The fact that they burn cane in Madras shows that they have grown cane to the utmost market capacity for its products.

Hon'ble Pandit M. M. Malaviya.—Q. Do you know if the sugar imported is used by all classes of the people? It is not confined to the upper classes?—A. It is used by all classes. Some strict Hindus do not take imported sugar.

Q. Sugar is eaten as part of their food by the people?—A. It is taken as food stuff. Jaggery is food stuff. The sugar of the people is jaggery. Sugar is a luxury to the poorer people.

Q. With the upper middle classes it has been a food stuff from ages past?—A. Yes.

Q. You have said in answer to one of your questions that you advocate the separation of the production of sugarcane from the manufacture of jaggery. How do you mean it should be done; it can only be done by legislation. Do you recommend that people should be prevented from manufacturing jaggery out of their sugar cane?—A. Separating the manufacture, i.e., instead of having small mills in villages, which are wasteful, one-third being wasted by burning, come to an arrangement with the cultivator "you give me this cane and I will give you so much money, or an agreed percentage of jaggery, and I will look for my profits in the additional jaggery that I will extract with my better mill and the possibly better quality of jaggery made."

Q. You do not contemplate anything but a voluntary arrangement?—A. Entirely a voluntary arrangement.

Q. Don't you think that the best course would be for the Government to help the growers of sugar cane to establish factories for manufacturing gur on co-operative principles? If Government helps, as you have suggested in your note, and the producers of sugar cane are encouraged to establish co-operative factories in central places for manufacturing jaggery, don't you think that would be the best arrangement for their welfare?—A. Yes. So long as you have some one under Government whose special province it is to control those factories, and advise. So long as Government give advances I think it is advisable that all loans should be under some control, and if you have a sugar expert, or a sugar department, he or they should be able to control those loans along with other work. It would bring the sugar industry into disrepute should money be thrown about recklessly and lost. Type of factory and method of working should be first carefully determined experimentally, then with full information Government would be in a position to encourage co-operative societies, or, if Government saw fit give assistance. The small gur central factory is, to be worked to advantage, not quite the simple proposition it looks.

Q. Suppose co-operative credit societies were established, and even without advancing money, Government encouraged the growers of cane with advice and in other ways to start gur factories, don't you think that they could improve the production of gur, and make larger profits than at present?—A. It could be done, but the problem of gur making so far as I know has not yet been tried on suitable lines for making it on a scale of even 50 or 100 maunds per day. The tendency has been to depend on old open, boiling systems introduced under what were quite different conditions from those required for high class gur.

ADDITIONAL WRITTEN EVIDENCE.

Note on the sugar industry submitted after oral examination.

Sugar production throughout India could be best benefited and improved by the establishment of a Government department which should be educational and at the same time conduct research on methods of sugar, and gur-making-manufacturing difficulties, canes, and their cultivation to best advantage, sugar yielding palms and their cultivation and products. This department should also be in a position to deal with questions relating to the advantageous disposal of the bye-products of sugar manufacture, such as the fermentation of molasses for different products, sugar recovery from molasses, etc. All this should be contained in one central department. Throughout India cane is grown under varying conditions as to climate, so that at first it would seem that different departments or centres must be established over the country.

This is not so as cane grown resolves itself into two classes :

- (1) that grown on dry cultivation or light irrigation, and
- (2) that grown on irrigation.

The largest areas of cane grown on dry cultivation are found in Northern India, and there also cane is grown on irrigation ; and whether cane is grown on dry cultivation or irrigation in Northern or Southern India the agricultural operations are the same.

Local variations of cultivation on one system or another may be advisable—for example in the Central Provinces a system of contour-line planting has had to be worked out to economise irrigation water and prevent soil washing—but these are details that could be taken up by a centralized department and work done on any such system as contour planting would apply to any hilly part of India.

Irrigation of flat lands is the same all the world over.

The question of suitable canes for varying climates is more complex, but it is simply a matter of trial and observation and could be carried out by an assistant deputed from the main station and under the directors' supervision. Once the most suitable canes for any given area have been determined, the work is done and the selected canes may be left to cultivators to choose from according to individual tastes. Should a new and likely cane appear then it would only be necessary again to make a series of tests of the new cane against the existing selected canes. It would not be necessary to test every new cane over every area as it could be foretold with fair accuracy from the period of growth what would suit Northern India or what would suit Southern India, and for physical characteristics, what might be expected to suit a fiercely hot climate like that of the Central Provinces in April.

A sugar department should be, for many years, partly educational and this part of its duties could best and most economically be carried on at one centre. As the greatest scope for educational work in sugar making and the advancement of sugar generally lies in Northern India any sugar department or institute should be established there, preferably in the cane-growing area north of the Ganges about Basti, Gorakhpur or Saran Districts.

Here it would be immediately in touch with the large cane-growing areas of the country and with dry cane cultivation in which most might be done in the way of improvement.

The problems of gur-making in Northern India alone would well repay investigation, as much of it is turned out of such low quality and so dirty that it sells at a price out of all proportion to its gur value.

The juices of Northern India are not as good as those of some other parts of India. But there are advantages that outweigh this and with the right way of doing things it is possible to make gur from Gorakhpur district cane to compete with the high quality gurs of Poona which sell at Rs. 5 to 6 per maund, while Gorakhpur District gur may sell from Rs. 2-8 to Rs. 3 per maund in local bazaars in normal seasons, and that, simply because of their unattractive appearance and qualities.

By varying the method of manufacture, gur can be made to suit the trans-Jumna markets which require a dry hard gur, or, soft buttery light coloured gur can be made to suit markets in the United Provinces and Punjab.

Gur-making seems a simple operation but there are points that a sugar department might well investigate.

With the introduction of the vacuum pan, triple effect, and the advance of engineering, sugar production advanced with a leap. Primitive processes, such as jaggery or gur-making, which were general 100 years ago, have become obsolete except in some Eastern countries with special markets, such as India. There it has been nobody's concern to take any particular interest in what is collectively a huge industry, and gur-making has been left as it was in the beginning except for the introduction of small iron cattle mills which are usually inefficient, or, if set so as to be efficient, are beyond the strength of the average cultivator's bullocks to drive them.

This is not as it should be, because in India jaggery (gur) is the form in which by far the bulk of the sugar consumed is taken.

A sugar department situated as indicated would also be in direct touch with the chief cane crushing factories of India which make sugar from the cane and from gur.

With the conditions under which cane is grown in India sugar factories working on modern lines can never be very large.

That being so, these factories work at a disadvantage compared with large factories elsewhere, in that the small factory cannot afford to pay for highly-trained Europeans, and trained men are not available to any extent among Indians.

To train men, both for sugar and gur-making, a small but complete sugar-making plant should be laid down in which different processes and their working could be taught. With this machinery all grades of men from the prospective factory manager to departmental toremen could be given the knowledge necessary for them to carry on the work of other factories.

Along with the sugar factory there should be a distillery and a factory laboratory with accommodation for students, a factory accounts department and an engineer's drawing office with some room for students.

With this arrangement, advanced chemistry students who intended to specialise in the sugar industry could be trained as factory superintendents and managers, and engineering students could be familiarised with sugar machinery.

Everything about this factory should be conducted as in a factory built to earn dividends so that the students may get the serious commercial atmosphere and careful accounts should be kept of the cost of all operations.

Higher grade students during their course would be put through each department.

This educational factory should preferably have enough land about it, under control, to grow its own cane or the larger part of it, and this land should also be used for experimental purposes.

Of the land for cane growing only a small area of, say, 20 to 30 acres should be permanently under factory cultivation. The remainder, except for special work, such as ratoon cropping, should, if possible, be arranged so that after a cane crop it may be leased to cultivators for three or four years for crops other than cane, coming back in rotation to the factory. In this way the factory area would be kept representative of cultivators' lands in the neighbourhood.

The railed-in experimental farm in India, in time, tends to have its lands manured and worked up until it no longer resembles cultivators' lands. The cultivator tends to look upon work done on these lands as unpractical.

Costs of all operations on these lands should be carefully kept, also manure costs and costs of irrigation systems.

All cane should be weighed and irrigation water measured.

Records of rainfall, maximum and minimum temperatures, wet and dry thermometers and sunshine hours should also be kept and from all this much valuable information could be gained.

Such a sugar factory and distillery would be largely self-supporting and the products should be sold, under supervision, by a reliable commercial firm interested in the articles to be sold.

All articles should bear the educational factory brand so that dealers and manufacturers would see what is turned out and so be kept interested in the factory work.

After the factory had started work, posts such as agricultural assistant, factory superintendent, assistant engineer, factory chemist, foremen, etc., should be reserved for students who had gone through their course satisfactorily and were waiting for outside employment. These would be paid posts. When a student had taken up outside employment he should be encouraged to retain some connection with sugar school so that he may keep his knowledge up-to-date and have his difficulties explained.

Such a factory would cover all manufacturing operations no matter whether raw sugars from cane or palms, or cane or palm juices were to be treated.

The operations are in all cases substantially the same. Apart from the educational side there should be a good laboratory, adapted for analytical work, research and technological research, in connection with sugar (including agricultural matters) fermentation, and alcohol. The laboratory section devoted to ferments could be adapted to work on cane diseases due to fungi.

Cane diseases in India have, so far, been mostly confined to common diseases and can usually be overcome by suitable manuring, care in selecting cane setts for planting, and by eliminating cane varieties unsuited to a given climate. Should occasion arise assistance in cane disease research could be obtained from Pusa.

The work of the department should include advising and assisting sugar factories and refineries.

It should also deal with agricultural matters connected with cane growing and experimental work on new canes, together with manures and the methods of application, and, when any point has been determined in connection with cane or manures that it is desirable should be demonstrated generally these demonstrations should be carried out on village lands.

Should a system of manure advances to cultivators be evolved the department would assist in promoting it and in determining on suitable manures. The proposals mean, with the educational side, a fairly large programme, but in India, more than other countries, is this necessary.

In sugar-producing countries where the industry is in the hands of trained and educated men the problem is simple. From sugar journals they see what is being done elsewhere and can apply anything that they think may suit them. As often as not they can investigate and rectify their own troubles and for special work may have a central laboratory or experimental station.

They have capital and know manures and how to apply them.

India is at that stage when only a few sugar-cane growers or sugar factories do any experimental work and they would often be glad of assistance.

To carry on the work of a sugar department there should be first, the Director; and it is important that the first Director should be a man who would introduce the right traditions into the department.

He should be a man who has had a training in chemistry and who has specialised in sugar. He should know factory and refinery work thoroughly and have a knowledge of cane and its cultivation.

By a training in chemistry is meant such a training as would have enabled this man to take his place in any other industry requiring such a training had he determined to specialise otherwise than in sugar at the end of his school of chemistry career.

Sugar schools are turning out what are sometimes called "sugar chemists." They are useful enough in factory routine for doing analyses of sugar and its products but they are not chemists. Chemistry cannot be divided into compartments and problems arise in sugar that require good chemists for their solution.

In a Director, Indian experience would be a decided advantage as the conditions are different from those of other sugar-producing countries.

The Director should also have a knowledge of the methods of disposal of bye-products from sugar manufacture and be able to direct research both in sugar production and the treatment of bye-products.

In short, the man required should have factory and field experience based on a chemist's training and should possess knowledge of bacteria, yeasts, and allied fungi. The latter should be included in the training of all chemists who specialise in sugar and particularly of those who have to work in cane growing countries.

There should also be an Assistant Director, preferably a chemist with some knowledge of factory work, but the latter is not essential.

Chemistry should be his strong point. The first duties of the Director and his assistant would be to select and train an adequate staff to conduct the educational side of the department, under the supervision of the Director and assistant Directors, and conduct research and demonstration work. There is already a sugar engineer in India. He would be included in the department.

A Farm Superintendent would be necessary to supervise agricultural work and here again assistants would have to be trained for experimental and outside demonstration work.

For outside work they would require careful drilling on the factory lands that outside work might be correctly done.

A botanical section to a sugar department is necessary, but seedling cane work cannot be carried out in Northern India.

Such a section has already been established under Dr. Barber in Southern India.

Though the botanical section and the centre of the proposed sugar department must be widely separated, so far as distance is concerned, it would be advantageous that they should work together in close co-operation. There are points in which experience in Northern India would be useful to a cane experimental station in Southern India and the central department would have all the means of testing canes for milling qualities, juice peculiarities and such like.

Entomological research is important but this could probably all be undertaken at Pusa. If so, it would be spending money needlessly to establish a section in a sugar department.

At first the duties of a sugar department would be largely educational. Later, as the industry developed the education side might be made of less importance.

Sugar-yielding palms would also come within the scope of a sugar department and their cultivation might repay investigation. It has been said that palmyra juices contain percentages of sugar varying from 11 per cent to 20 per cent but anything like 20 per cent I have never seen; still, variations are worth investigating.

What might prove to be the weak part of this scheme would possibly be the control of cane experimental work at a distance.

This might be got over by making a soil and climate survey and dividing the country into zones or representative areas.

In these areas having a sufficiently large cane cultivation, or which show prospects of increasing to a sufficient area, an experimental station dealing with cane might be established with a small but efficient staff.

Such a station would be under an agricultural assistant who would work under the Director's instructions. When necessary an assistant chemist could be deputed to do analyses, and, with a carefully kept system of accounts, all necessary information could be obtained. It is probable, that if gur manufacture and cane growing in the large cane areas of the North were conducted rationally and due attention given to markets, districts which now grow cane at a heavy cost might find it better to turn to other crops, so that a few of these isolated stations would serve to do all the work necessary.

This suggestion of putting the cane crop under one department might be considered with regard to other crops. Instead of agricultural departments spreading themselves over all sorts of crops why not specialise and create a cotton department, rice department, etc.? Throughout provinces duplicate work goes on in all directions and men spread their energies too much to become really expert in any one branch unless they break away from the established system.

With some re-arrangement it might be done without undue increase of staff and should result in increased efficiency.

WITNESS No. 171.

Mr. C. T. Ambler. MR. C. T. AMBLER, *Messrs. Ambler & Co., Managing Agents, Ambler's Slate and Stone Co., Ltd., Dharhara.*

WRITTEN EVIDENCE.

Capital.

Q. 1.—My own experience has been, in connection with the slate company now worked for many years, failure to obtain needful outlay from any of the Calcutta banks, who decline to do any business with mofussil concerns or to accept as security a lien on slate stocks, machinery or landed security, goodwill, etc. This is a concern of many years' standing and established solvency; the material worked is unaffected by exposure and is not subject to any fluctuations in value, the selling rates being fixed by myself, and there is no competition as the only other slate concern is in the far north-west and the heavy freight charges limit the area of their working.

I keep accounts with the Alliance Bank of Simla, my drawings being covered by long term fixed deposits in their custody—their own paper. It is a limited company and they will not advance against the scrip though accounts filed with the Registrar of Joint Stock Companies show 10 to 15 per cent. profit on a Rs. 2,00,000 capital.

Unless a company is floated by a Calcutta agency house, banks will not advance against its scrips. I have no use for an agency house and am not disposed to pay commission, etc., as I trade direct with the users of the material for cash and local delivery and so have no bad debts.

The other slate company had for its director the manager of the Punjab bank now amalgamated with the Alliance Bank of Simla, Limited, which financed it in its early days till it had prospered to such an extent as not to need advances; it has now a large reserve to draw upon. The original shares of Rs. 100 each are now valued at Rs. 235 and for some years past the company have been paying 2½ per cent. dividends.

If similar conditions existed for my slate business, it would have greatly helped me to expand my output and meet a demand that has been and is in excess of it.

Q. 2.—The sources from which capital is obtained for industrial enterprises in the mofussil are Indian bankers but their rates of interest are very high and unless good profits are immediately made it is a hard struggle for existence, and in some cases dismal failure results. Presidency Banks will not finance or accept mortgages on landed property except on Calcutta property.

Q. 3.—Coal companies and to a less extent tea gardens, for want of labour generally.

Government assistance.

Q. 4.—One instance of useful Government aid was the present Bengal Iron and Steel Company, Limited. The original company failed and the Government took it over and put it in charge of an Austrian engineer, Ritter von Schwatz, who developed the working in pig iron, cast iron pipes and mains, and East Indian Railway standard iron sleepers. A company was formed, with a guarantee from Government to purchase a specified quantity every year. Of its present successful operations I have no need to speak. Another instance is that of the Darjeeling-Himalayan Railway, by a subsidy.

Q. 5.—Sub-paragraphs (2), (4), (6) and (7). According to special needs.

Of (2) there is the example just given of the Darjeeling-Himalayan Railway and to restrain foreign competition.

(4) Loans at fairly low interest, not without.

(6) Provision of share capital would materially help me in my own case.

(7) A direction to engineers to purchase locally in preference to importing the same material or substitutes for their requirements. No other guarantee necessary.

Q. 6.—The control should be on the lines in force for guaranteed railways with access to accounts.

Pioneer factories.

Q. 7.—I do not know of any pioneer factories run either directly or indirectly by Government.

Q. 8.—To start pioneer factories, proper working conditions should be established, and for working mines or quarries long term leases should be secured with a minimum rent or royalty for the first term of years, with option to the lessee to continue on at a certain defined increase in the original lease; the shortest term for such mining or quarrying lease should be 50 years in two terms say of 25 years each, the first term on the lower rate, and the second at an enhanced rate, with option to the lessee to surrender the lease at any time at short notice if the working from any cause is unprofitable.

Such pioneer factories should be handed over to private capitalists or companies at such a stage as was done in the case of the Bengal Iron and Steel Company, Limited, referred to above.

Q. 9.—All concerns are hampered by heavy contributions to managing agencies, who in many cases have no technical knowledge. Unless a business makes a good progress in spite of this heavy handicap, many cannot sustain the burden and the company's shares go down in value. Financing agencies.

Q. 10.—New mofussil banking agencies could render assistance in financing local concerns at a moderate rate of interest and dealing with security offered as was for the Kangra Valley Slate Company, Limited, by the Punjab bank.

Q. 11.—I do not know of any industry developed or assisted by the formation of co-operative societies. The co-operative societies deal entirely with agricultural work and societies. have had a fair measure of success on their present lines but are not in a position to deal with industrial concerns on banking lines.

Q. 13.—Necessary safeguards to prevent this occurring. The assistance given should be rendered to develop an industry and no more; it should then be able to carry on unaided. Limit of Government assistance.

Q. 14.—Government is directly concerned in developing local industries and should take into account the heavy land freights as compared with sea freights. This difference must be compensated for to prevent external trade swamping the local industries by dumping down cheap inferior goods at rates that would be impossible to compete against even with cheap Indian labour. It will take time before machinery to lessen cost of production can be set up. Under these circumstances it will require all the aid Government can give and any question of limitation should not be now dealt with until a good start is made, which will not be in the immediate future.

(Note.—Witness did not give oral evidence.)

WITNESS No. 172.

MR. R. L. B. GALL, *Chairman, European Jute Dealers' Association, Calcutta.*

Mr. R. L. B. Gall.

WRITTEN EVIDENCE.

Qs. 1, 2 and 3.—Consideration must be given to enterprises other than those in Calcutta. Capital. The supply of jute to jute mills, wheat to flour mills, etc., is an essential part of the industry. A great deal of the capital used in financing the marketing of these raw products is from non-European sources. The handling, baling, etc., of loose and baled jute is largely financed from non-European sources. Amongst the difficulties to be noted is the slow return of this capital from the interior owing to hoarding, and the necessity for large movements of specie until growers are willing to accept notes or begin to understand the cheque system.

Q. 9.—The seed industry should be amongst the pioneering work of Government. The Pioneer factories. policy should be gradual relinquishment, as was done in the case of the Aligarh dairy, but there should be Government supervision for a number of years to insure that the business is being run on sound lines, as distinct from purely profit-earning lines.

Qs. 11 and 12.—There has been an extension both in production and consumption of Co-operative imports by this agency. While the ryot saw only debt ahead of him his outturn was limited societies. to necessity. Once free, a larger outturn follows under the stimulus of wealth, with a wider demand for what to him have hitherto been luxuries—e.g., salt, cigarettes, woollen goods, etc.

Q. 22.—Research should be made regarding an extended use for resources—e.g., jute can be made to replace cotton, wool, etc. in many special trades. Research abroad.

Q. 25.—These are required. As an agricultural country more intensive farming is required. Surveys for indus- This is only possible by diverting animal manure back to soil. This postulates a cheap smoke- trial purposes. less fuel to replace manure.

Q. 34.—These should be appointed. They should be business men with as wide a knowledge Trade representa- as possible of Indian imports and exports. They will be necessary if any system of control tives. of exports is decided on after the War. It is unwise to define duties beyond the furnishing, collecting and tabulating of all commercial data; reporting on markets, contracts, etc.; and bringing possible buyers and sellers in touch with each other.

Q. 39.—Banking facilities should be increased, so far as the mofussil is concerned, by the Banking facilities. development of co-operative societies into local banks. The present object is to give loans, and receive deposits. The larger object to be kept in view is the creation of current accounts with a view to minimising the risk and loss of hoarding.

Q. 41.—Where land is under the Court of Wards, even where a co-sharer is willing to give Land policy. a permanent lease, the officer under the Court of Ward refuses. This is bad policy since the taking up of land for marketing produce is for the permanent benefit of the estate.

As a general proposition all land law should be simplified especially as regards partition of Hindu estates. The law as it at present stands makes the acquisition of land even where the seller is willing to sell, difficult, tedious and expensive.

Q. 42.—The system of granting surplus railway lands for pioneer industries is beneficial both to the railways and to the pioneering individuals or firms. The leases are, however, only granted from year to year without fixity of tenure. Tenures should be given for a fixed term

Technical and
scientific depart-
ments.

Statistics, etc.

Prevention of
adulteration.

Registration of
partnerships.
Roads, railways and
waterways.

General.

of years with power to raise to neighbouring values at the end of the period. Lessees should have power to acquire outright at a fixed basis at same period.

Q. 63.—*Apropos* of the activities of the Department of Agriculture and the recent efforts to get into closer touch with the firms in the jute industry as also to take fuller advantage of their willingness to help, steady development on these lines should be urged. Fuller research is required into such processes as retting the fibre, effects of moisture, etc. A great deterioration of fibre and actual loss in jute is caused by haphazard methods of steeping. A careful study of this problem by Government might very much minimise these factors, say by the provision of suitable steeping tanks, etc. Imperial departments are preferable to local and provincial and funds should come from Imperial resources.

Q. 82.—The statistics were formerly published in too voluminous a form for general trade purposes. Recently they have been more specialised for the jute trade and there has been manifested a more earnest desire to get at the figures required by the trade. Further developments on these lines is desirable; arrangements might be made that any statistics required by a particular trade can be supplied on payment. Such statistics, *e.g.*, as the monthly imports of jute into Calcutta and exports from Calcutta might with advantage be supplied by the Department of Statistics if it is willing to issue them in the forms which the trade find most useful. The same remarks generally apply to commercial intelligence and the "Indian Trade Journal." A change in attitude is indicated. In place of publishing matter in the forms selected by Government an effort is necessary to ascertain in what forms information is most useful to the various trades and an endeavour should be made to supply the demand.

Q. 91.—It is held by many that the adulteration of jute by water should be penalised. So far a working proposition has not been evolved but it is certainly in the interests of the trade that this should not be lost sight of.

Q. 96.—This question should be strongly pressed in the affirmative.

Q. 97.—This question very deeply affects the jute trade.

- (a) Roads are an urgent necessity.
- (b) Rivers are being allowed to deteriorate.
- (c) Rail facilities are inadequate.

Q. 98.—The question of enforced freighting of goods by higher rated routes requires to be dealt with. For example, jute from Mymensingh to Calcutta can at present be freighted by three routes,

via Naraingunge and Khulna,
via Juggernathgunge and Goalundo,
via Fulchari and Sara.

All rates should either be made equal or when booking is suspended or curtailed in any way by the cheapest route, booking at the same rate by an alternative route should be compulsory. The present system makes it an advantage to the railway to give reduced carriage facilities by the cheapest routes.

The question of alteration of rates also requires attention. A minimum notice of any enhancement of freights should be compulsory.

The question of traders tickets should also receive attention. Where firms or individuals book large quantities of goods by rail, facilities for visiting and inspecting branches or despatching centres should be granted.

Q. 99.—The most pressing need for the jute trade is the extension of the broad gauge to Siliguri.

Q. 100.—Generally this Association would support any representation of the steamer companies regarding Bengal and Assam waterways in this connection as benefiting the jute trade.

Q. 110.—The Association on broad lines believes that a larger share of the trade in jute can be carried on with advantage within the British Empire. It would support any workable scheme which would tend to reduce the manufacture of jute outside the British Empire especially in enemy countries provided it could be ascertained that the decrease in the demand for the raw material from these outside countries would be made good by the increased demand for British made manufactured goods.

ORAL EVIDENCE, 5TH JANUARY 1917.

President. Q. In answer to questions 1 to 3 you say that the handling and baling of jute is financed by non-European sources? What do you mean by non-European sources?—A. Indian sources.

Q. In what way is it financed?—A. The Marwari bankers to a large extent and the Bengali arathdars also provide a large portion of the funds which are necessary for handling jute up-country.

Q. These are the people that complain that the slow return of this money is due to hoarding?—A. We hear complaints and there is no doubt that the jute trade is the biggest culprit in that way, in Bengal.

Q. Do you think that some of this will disappear as people realise the value of using cheques and paper money?—A. I think it will, but it will be a very slow process.

Q. There is no other way of financing through any local banks or branches of banks?—A. The thing that has occurred to me in this connection is that the co-operative societies might go a step further and teach the people the value of leaving money with them instead of hoarding it and burying it in the ground.

Q. Do you think that the real difficulty is want of confidence and that people need to be educated?—A. I think the man up-country does not want it to be known that he has money. He does not like that idea.

Q. Do you think it is due to some form of nervousness?—A. That is so.

Q. Have you noticed any appreciable increase of hoarding in consequence of failure of the swadeshi companies?—A. I do not think so but I think that hoarding in Bengal has appreciably increased since the beginning of the War.

Q. On account of a vague fear as to the war conditions?—A. I think it has been due principally to the fact that there has not been the same opportunity given to the ryot and the man up-country to send money back to Calcutta by the purchase of goods. It was most marked in 1913 to notice the way in which the native up-country was beginning to indulge in luxuries. He was buying woollen goods which he had never thought of before. He was buying cheap German walking sticks and such things simply because he had the money and did not know what to do with it. The result was that the money came back to us eventually here. He bought corrugated iron in very large quantities using it in place of thatch. All these things that he was buying had to be paid for in Calcutta and therefore the money we sent for jute was being returned to us. Since the War there has not been that opportunity. He has not had the opportunity to buy.

Q. You think that this is a distinct result of the War?—A. It is only since the War that this has occurred. The ryot would buy the goods still but there are less goods for him to buy and he is now hoarding more than ever.

Q. Is it not a more satisfactory way to see his money put in some bank where it could be used in a satisfactory way?—A. At the present stage I am inclined to argue the other way. I think myself that at the present stage it would pay the jute trade to educate the ryot and the man who deals in jute to become more luxurious because as he acquires these tastes for "luxuries," as he calls them, he would be induced to grow more jute: to pay more attention to his crops. We will get a larger jute crop, a much better result from the land than we are getting at the present moment. Later on it might be bad but at the present stage it might be good. I think we can give the ryot a taste for luxury quicker than a sense of security in a bank.

Q. Assuming that this is a correct conclusion, how are we to take action on your suggestion?—A. I think you cannot certainly do anything until the termination of the War, because you would not be able to bring in the necessary goods. After the War is over and imports are again free, it might be possible, through these co-operative societies, which are the only agency we have at the present moment for getting near him, to provide displays of goods and give him an idea of how to spend the money, in other words, to do for him what the large shop does for the European.

Q. Are the co-operative societies doing anything by way of propagating and distributing information that will open up the mind of the ryot?—A. I think to a certain extent they are. I saw a note in the annual report of the Fibre Expert about some work that they were doing, and which was outside of their ordinary work, in the way of helping the ryot and I dare say they could do more under stimulus. I think myself that we could do a certain amount if Government asked us to. We could in many places up-country give displays of goods and so on. We have done that to a limited extent in the way of providing food shops.

Q. Government could not ask you unless it pays you and you would not do it if it does not pay?—A. I think we want encouraging. Last year we were asked by the Agricultural Department to help them in some of their experiments and when they indicated their desire we did it.

Q. That is quite a different matter from encouraging people to buy walking sticks and gramophones?—A. So long as the trade is encouraged we might even do that. We want Government to ask us to help. I think the Marwari will eventually do it because he is the man that looks after that sort of thing.

Q. What seed industry do you refer to?—A. The improvement of the seed for jute and distribution of it.

Q. Is that not being done by the Agricultural Department?—A. They have done a certain amount. They agree that more could be done. Such a thing could be done better, I believe, jointly with us than by the department alone.

Q. Speaking of trade representatives you say that they will be necessary if any system of control of exports is decided on after the War. Had you in mind the possibility of any kind

of fiscal control being adopted, for as one knows if you once interfere with the natural course of trade you have to provide artificial means for discovering rapidly and promptly the effect of any change in fiscal policy?—A. That is so and I had also more particularly in mind the difficulty which we had discussed in the event of it being thought advisable after the War to give preference to neutrals and allies as against enemy countries.

Q. In your answer to question 98 you refer to the fact that railways have a temptation to provide insufficient accommodation by the cheapest route so as to force transport to take the more expensive route. You do not mean that the Eastern Bengal State Railway artificially goes out of the way to provide insufficient accommodation?—A. On one occasion they did and we strongly protested but as a matter of fact during the last two years speaking for the jute trade generally we have been getting on very much better with the railways. They have been more willing to meet and assist us.

Q. In a matter of this kind we might leave it confidently to your association to bring the matter to the notice of the railway itself, or if necessary to the Railway Board, and presumably they will be willing to help. In a case of this kind it might not be advantageous for the railway to force you to go to the more expensive route because in effect the railway company would be reducing their own traffic?—A. I think all the same it would be an advantage to have from this Commission an expression of opinion that the railways are more or less to help trade and not to hinder it. I think that individual cases might be dealt with by an association, but I think that this Commission might make it clear that the railway is not a purely profit-earning concern and that the railways ought to go further than that and assist in the development of the country. They should be content to take an increased profit in later years rather than an immediate profit to the detriment of trade.

Mr. C. E. Low.—Q. Where do these Marwaris who finance the jute trade up to a certain point get their money?—A. It represents accumulated profits over a very large number of years.

Q. Don't they ultimately get a good deal of finance from the banks in Calcutta?—A. I think it is a very very small proportion. The tendency is rather the other way. When the banks get into trouble they draw money out of the local bazaars.

Q. By increasing their rate of interest?—A. Yes.

Q. The co-operative societies do not use the money all the year round but only in certain seasons?—A. That is so, I believe.

Q. Do you know what time of the year?—A. After the marketing of the crop and before the commencement of the next seed time.

Q. Is that the time when their money would be useful to the jute trade?—A. It might be utilised in financing those imports of which I spoke. They could be utilised in that way.

Q. I suppose you contemplate a provincial bank holding a good deal of funds so as to be able to deal with them when wanted by these co-operative societies?—A. That would undoubtedly be a good scheme. I cannot say I have thought of it.

Q. At present as you know the central and district banks invite local deposits and so far they have an educative effect. But they do not make the money available for other purposes than co-operative societies. It would be easy to make co-operative money available for ordinary trade and industry?—A. Not at the present stage but I think it would come in due course.

Q. Do you think that the co-operative society is educative, teaching the people thrift and up-to-date ideas?—A. I think so.

Q. Have you any views on the subject of the jute markets. Do you know if the ryot up-country gets a fair price for his jute or whether too much is being taken by the middleman?—A. On that point there is no doubt whatever that the ryot has got his full share of the prices paid for jute.

Q. It was said that the difference between what the ryot got and what the jute was sold for in the Calcutta market was so much, but no attempt was made to analyse how much was profit and how much was cost of transport?—A. I think there is no article marketed really on a less margin of profit proportionately than jute. Speaking from our own experience I should say that the actual margin between the amount paid by the man who buys up-country and eventually sells in Calcutta works out at not over 4 annas a maund from which he has to pay charges of establishment and so on. That is 4 annas on an article costing R10 which, I think, is a very small margin of profit.

Q. Another point is that it passes through several other hands before it gets to that man and is it not a fact that there is an increasing tendency for the mills to buy jute direct from the ryot?—A. That, I think, the trade has done less than it used to. The proportion is undoubtedly less than it was some years ago.

Q. I have had it said to me that the mills especially in the north of Calcutta actually buy the jute from the ryots themselves. Would you support that statement? These ryots who grow the jute for the mills bring the jute themselves?—A. That is quite correct, but the proportion is infinitesimal.

Q. It does not show any signs of increasing?—A. No.

Q. Have you considered the idea of co-operative sale of jute by the ryots?—*A.* No. I do not think it is possible.

Q. Supposing a number of ryots put up three or four hundred maunds between them, would it be possible for them to sort and grade it themselves?—*A.* Impossible.

Q. You think they have not got sufficient technical skill to make right selections?—*A.* They would have no knowledge of what the mill's requirements were. In any case the quantity that the ryot could bring would be so trifling.

Q. Supposing you have got a number of ryots co-operating together to put up a marketable article?—*A.* At one time in the Jessore and Khulna districts it was common for a number of ryots when they could not sell otherwise to put their jute in a boat and come down by water to Calcutta and hand it over here for sale. Since we have pushed up into those districts they very much prefer to sell to us direct in the district.

Q. In other provinces with articles less difficult to deal with than jute a substantial amount has been collected and marketed. Is it not the case that people in Bengal especially in a very highly organised trade like jute in contact with a very unorganised community like the Bengal ryots is rather inclined to pitch their standard too low?—*A.* I do not myself see how the ryot or even a number of ryots joining together are going to get any very great advantage out of coming to us direct or through a co-operative society. I believe myself that he would be able to market his produce just as well under the present system.

Q. Would you or the members of your Association be prepared to give the system a trial?—*A.* We would be quite willing to try it.

Q. You speak of the desirability of making Government statistics more useful and you make a suggestion about the figures of monthly imports of jute and exports from Calcutta. Is it not published in some form or other?—*A.* The Bengal Chamber of Commerce took over that monthly record and is now making it.

Q. Since when?—*A.* They have been doing it for quite a number of years—for the past 8 or 9 years, I think.

Q. Is there anything gained by Government doing it as well?—*A.* My suggestion was that the Government might as a matter of fact do that and that the Bengal Chamber of Commerce might give it up and it might take the place of certain statistics which are at present compiled by the Department of Statistics and which frankly speaking are of no earthly use to anybody. They issue them in a form which is of no use to us.

Q. What you suggest is a sort of round table talk for overhauling the whole thing and modifying the form of the statistics?—*A.* I think an exchange of views between us and the Department of Statistics would enable them to understand what we want and what would be useful to us.

Q. Does it include the railway and river-borne trade?—*A.* I believe it includes all that. We do know that as a matter of fact these figures represent or are supposed to represent the quantity of jute which comes into the Calcutta trade circle. That trade circle excludes mills up the river and down the river. Since these mills take the bulk of the jute which comes in the figure given is no use at all.

Q. Are not those things represented from time to time by your Association?—*A.* What we generally do is to make an arrangement to get the figures ourselves. I think an exchange of views between the department and ourselves would remove a lot of anomalies.

President.—Q. Is the Director-General of Commercial Intelligence ever a member of the Chamber of Commerce?—*A.* I do not think so.

Q. The trade generally have confidence in the Chamber's figures?—*A.* I think so.

Sir F. H. Stewart.—Q. Would people have equal confidence if this is transferred to the Statistics Department? Would they get it equally quickly?—*A.* I do not see any reason why they should not do so. It is only a question of painstaking. The Department of Statistics would undoubtedly take the pains.

Mr. C. E. Low.—Q. I take it that you people actually collect the statistics and supply figures. The Department of Statistics does not collect statistics in the strict sense of the word. It compiles the statistics that have been collected by other people. I think this is a point to remember when certain statements are objected to as unsatisfactory or inaccurate. In cases like this your Association can take action at once. The Director of Statistics cannot do that?—*A.* That is quite correct. But on the other hand if we were closer in touch with the Director I dare say that any little difficulties could be talked out and got over. At the same time our statistics are not kept for general purposes. If they were handed over to the Department of Statistics they would be available for every one and it would be an advantage to the whole country.

President.—Q. The ideal condition is to have a specialist for each natural group of figures?—*A.* That would be impossible in practice.

Mr. C. E. Low.—Q. It is also the case that statistics compiled by the different associations are what you may call partial. They cover some portion of the trade which the association is directly interested in and when it is necessary to know something else there is a difficulty from the Government point of view. Since the War began that has been found to be

the case by the Government of India. The Director of Statistics would be useful if he could get two sets of figures compiled on a common basis, which is not being done at present?—A. That is so. That is a case of mutual help with direct gain to both.

Q. A good deal may be done by discussion of the position between the associations and the Director of Statistics?—A. If the Director were a member of the Chamber of Commerce he would be constantly in touch with the association and that would be a direct advantage.

Q. With reference to what you say about the larger jute trade within the British Empire do you think that if you restricted exports of jute to European powers that substitutes might be encouraged?—A. There would be such a tendency even with a fairly big tariff against her. I think it probable Germany would continue to buy raw jute. Her textiles are a necessity.

Q. Do you think that fibre pulp is likely to get cheaper?—A. I should think not. So far as one can judge at the present moment, so long as we are able to turn out the requisite amount of jute here in Bengal under Rs. 10, I think we can control the trade of the world. I mean Rs. 10 per maund landed here in Calcutta and Rs. 50 per bale f. o. b. for export.

Q. If the Central European powers make substitutes they would make it at a loss?—A. I believe so.

Hon'ble Pandit M. M. Malaviya.—Q. How many jute mills are there here?—A. I think about 40, but I am not sure.

Q. How many more would you require to manufacture the rest of the jute that you export?—A. Out of a total crop of about 83 lakhs of bales the present mills will consume some 60 lakhs. In order to cover the whole jute crop you would require another 33½ per cent.

Q. You have no doubt that you can find a market for all the jute that you would manufacture?—A. So long as freight is available there would be a market for every bale.

Q. Even if substitutes are found, the natural advantages which you have will probably enable you to hold your own against artificial substitutes?—A. I think so.

Q. You say that your Association would support any workable scheme which would tend to increase the manufacture of jute inside the British Empire provided it could be ascertained that the decrease in the demand for the raw material from these outside countries would be made good by the increased demand for British made manufactured goods. Why should this be necessary if you can find a market for every bale that you can make?—A. I do not think we should commit ourselves to a proposition for all time. It is always possible that some day or another some country might find a cheaper substitute. There is no chance of that at the present moment but one never knows what may happen in the future.

Q. You would not to avert that contingency let enemy countries enjoy a share of the trade?—A. I would legislate when the time came.

Q. And if necessary you would protect your own industry by other means?—A. In any way that was necessary.

Q. You do not think there is any difficulty in manufacturing the entire raw material in this country. It is only a question of supplying more mills?—A. I do not think it could all be manufactured in this country. I was talking of trade within the British Empire. There are a large number of uses for the fibre which cannot be met by this country at the present stage.

Q. For instance?—A. In Dundee, for instance, they turn out all sorts of beautiful carpet from jute. Austria before the War was turning out tapestries and nursery curtains and hangings. I do not think that at the present moment we could do that with advantage here. But I am quite certain that inside the British Empire it could be done.

Q. Do you know of any place inside the British Empire where this is being done?—A. In Dundee they are undoubtedly turning out very beautiful carpets out of jute. In Italy I saw wall paper which had been made by the Italian mills and they had been very beautifully turned out. It is only a question of giving attention to the dyeing part. The manufacturing would offer no difficulties. It is the turning out of the finished product.

Q. Does not your Association look forward to the time when you will do that here instead of sending the jute to Dundee?—A. Our Association really deals only with the raw material although we know the manufacturing side of it. It is quite possible in time to do this here, but it requires very highly skilled labour, and it also requires special chemicals for dyeing and bleaching which at present are not available here.

Q. What proportion of the jute would be used for manufacturing specialities?—A. I should think that before the War probably from 10 to 15 per cent. was being used for purposes outside the ordinary carrying trade of the world.

Q. 10 to 15 per cent. of the quantity exported?—A. Probably 20 to 25 per cent. of the quantity exported.

Q. Excepting that could you manufacture the rest of it in India without trouble?—A. I think myself that there are local requirements in Great Britain which it would pay very much better to make there. What pays India is the large order for a particularly uniform type of production and not specialities. It has not paid us to make specialities.

Q. Is your Association entirely composed of European jute dealers?—A. Yes.

Q. You say that consideration must be given to enterprises other than those in Calcutta. Do they not receive sufficient accommodation at present?—A. I merely suggested that in

considering the question of capital it was necessary to remember that there are enterprises outside Calcutta. Very large quantities of capital are used outside of Calcutta.

Q. Has there been any insufficiency of accommodation for these enterprises?—*A.* Not with reference to the jute trade. We have had ample funds for jute enterprises in Bengal.

Q. You say that co-operative societies should be developed into local banks. Don't you think that you want a provincial bank, a larger and a more central bank?—*A.* Undoubtedly you want a larger bank.

Q. What would you wish that bank to advance money on?—*A.* I am afraid I have not given any consideration to the subject.

Q. In answer to question 41 you say: 'It is bad policy since the taking up of land for marketing produce is for the permanent benefit of the estate.' Do you lack facilities for marketing produce?—*A.* I was talking there purely from the Association's point of view. We find that it is very difficult when we are opening up places up-country to get a permanent lease, no matter what we are willing to pay. One hesitates to put down the best type of building in such a case.

Q. You mean for godowns?—*A.* For assorting premises, for the pressing and baling of jute. If we had a permanent title and know that our tenure was fixed, we could put down a better type of building. In the Court of Wards, it is immaterial what you are willing to pay. They simply will not give you a permanent lease.

Q. You suggest that adulteration of jute by water should be penalised. You would require to penalise many other things if you started on this course?—*A.* My own personal opinion is that it is impossible to evolve a practical scheme.

Q. *Re* railways, is no notice given of the enhancement of freight?—*A.* The other day the Assam-Bengal Railway enhanced rates without the slightest notice.

Q. Did you make any representation?—*A.* We did and were met at once. It would however be an advantage if some arrangement could be made by which the rates could only be altered after due notice to the trade. Such notice gives time for discussion whether the enhancement would act as a detriment to the trade or not.

Q. Have you made any representation to the Railway Board?—*A.* We have not done so as to the general principle.

Q. You speak of traders' tickets, what are they?—*A.* In view of what the railway position generally is at present, I do not think it is worthwhile urging the matter. I had the idea of something that they do at home in order to give special facilities to traders for inspection, etc. of branches. There is no doubt that it would be an advantage but it is a trifling point really.

Sir F. H. Stewart.—*Q.* What proportion of the capital used in the jute trade is non-European?—*A.* In the earlier stages I should say about 80 per cent., that is, before the jute comes to the up-country station where it is dealt with. After that I should consider that 50 to 60 per cent. is still non-European.

Q. Is that all in specie?—*A.* All in specie except in one district where we have begun to use notes. It is very difficult to get the people to accept anything except rupees.

Q. It is a matter in which improvement must come gradually?—*A.* I think so.

Q. With regard to what you say in answer to question 100 regarding steamship companies and the waterways, is your Association represented on the Inland Waterways Board?—*A.* No. We are not.

Q. Are you consulted at all with reference to these questions?—*A.* We have now a promise that we will be consulted, whenever any special points come up, such as the bridging of an important waterway.

Q. Do you think that the demands of the steamship companies are sometimes a little unreasonable?—*A.* I would answer the question if I may in the other way by saying that undoubtedly in the past the railways have been allowed to do things which they had no business to. One of the most glaring cases is the Akhamah-Ashuganj extension of the Assam-Bengal Railway where they have been allowed to cross the river Teesta by means of a low bridge which practically stopped the whole of the boat traffic on that most important river.

Q. And it was an existing boat traffic?—*A.* It had been in existence for years before and the real object was to divert the traffic on to the railway and so kill the boat traffic.

Q. Can you suggest any other possible centres in the British Empire for the jute industry besides Calcutta and Dundee?—*A.* I certainly think they are the two best. I do not think that there is any doubt that with the growth of population the manufacture could be carried on in Australia and elsewhere. It is only a question of labour.

Hon'ble Sir Fazulbhoy Currimbhoy.—*Q.* Are the members of your Association exporters or consumers?—*A.* We are neither. We are simply dealers, merchants who buy jute in the mofussil and then sell it in Calcutta. Our Association represents this branch of the trade.

Q. They have their own presses?—*A.* Yes, in the interior.

Q. How many presses belong to Europeans and how many to Indians?—*A.* As a matter of fact all the selling in Calcutta is done through Europeans through members of our Association and while the Association does not actually control the whole of the up-country part they actually act as agents for practically the whole of the up-country business.

Q. They buy up-country and then they sell it to the mills?—A. There are two different parts of the business represented in our Association. One is people like ourselves who have our own agents up-country and sell jute to the mills and pucea balers here. The other is the broker or agent who represents the native up-country. He does not actually do the baling.

Q. Are the European dealers who sell to the mills financed by the banks here?—A. They are.

Q. Has the Bank of Bengal any branches up-country for financing?—A. They have.

Q. How many?—A. In the jute districts they have 6 or 7.

Q. The financing is all right?—A. There is no difficulty as regards financing.

Q. The up-country purchases are mostly financed by Indians?—A. Yes, 80 per cent. of the finance is done by the natives.

Q. How is the jute sold, is it brought to a market place by the ryots or do they sell it in lots to some middleman?—A. The custom varies largely according to the district. In some places the Bepari goes to the ryots' houses and buys one or two maunds and so on till he fills his boat and then he brings it in. In other part as in Northern Bengal the ryot takes it in his cart and brings it to the market place.

Q. Do the cultivators get any news from the big jute centres whether the jute prices are up or down?—A. Our experience is that when there is a rise they know it as soon as we do. When there is a fall they profess ignorance about it for a month.

Q. With reference to what you say in answer to question 110, suppose there is an export duty or something of that kind and that the jute was restricted to the British Empire, don't you think that a country like America will be able to substitute cotton and that consequently the jute trade will go down?—A. The price of cotton is so high that they could not do so for some time to come. It would be a question of what the export duty was.

Q. But India will not be able to consume all the jute?—A. I think we could always protect our trade so as to compel America to buy what she wants from us.

Hon'ble Sir R. N. Mookerjee.—Q. Your Association is 18 months old?—A. About 15 months.

Q. Are you aware of the facts and figures of the headways of bridges on all the railways?—A. I have been connected with the trade for the last 25 to 30 years.

Q. You do not represent the steamer company in any way?—A. I am not interested in the steamer companies in any way.

Q. You are aware that the steamer companies made complaints and after arbitration they gave way and admitted that they were wrong?—A. I am aware that it was held by those who arbitrated in the matter that the headway for railway bridges as asked for by the steamer companies was too high. The railway companies wanted to make it too low and the steamer companies wanted to make it too high.

Q. Has the steamer or the railway helped the jute industry more?—A. I think they have both helped us.

WITNESS No. 173.

Mr. J. B. Lloyd.

MR. J. B. LLOYD, of Messrs. Shaw, Wallace & Co., Calcutta.

WRITTEN EVIDENCE.

Government assistance.

Q. 5.—I am in favour of methods (1), (2), (3), (4) and (7), but more particularly of (4) and (7). Different methods are suited to different industries and circumstances, and I consider that if Government are to assist industries financially, the wider their powers are, the better.

Q. 6.—I think that there should be Government control under methods (3), (4) and (6), and that this control should take the form of Government Directors who would have the power of veto.

Pioneer factories.

Q. 8.—I consider that in all industries, Government should only pioneer, provided that private capitalists will not do the pioneering work. In cases where Government do pioneer industries, I think that the first opportunity should be taken of handing over the pioneer factory to private capitalists.

Co-operative societies.

Q. 12.—I consider that co-operative societies would be most useful in the distribution of the following commodities:—Coal and coke, tea, agricultural seeds, agricultural implements and manures. One great difficulty in most industries in India, is the proper organisation of adequate distributing facilities, and few industries can afford to establish selling agencies all over the country, for the one particular commodity produced. By the establishment of co-operative societies which would distribute many commodities, this difficulty would be overcome. Messrs. Shaw Wallace & Co. have experienced considerable difficulty and, in fact, failure, in their attempts to retail fuel to the native populace in the North-

West Provinces. We sent up exhibits of Bengal and Pench coal, to the Lahore Exhibition, and ran a stall at the exhibition, in charge of an European assistant, and for several months, ran an experimental depôt for the sale of coal in Lahore. No real progress was made, and as the experiment was running at a loss, it was discontinued. I suggest that co-operative societies might usefully take up the retailing of coal to the populace of the North-West Provinces, and other provinces in which wood and dung fuel are now being used.

It can hardly be doubted that, when a serious effort is made to increase the agricultural production of India, the question of distribution of fertilisers must arise. Without the aid of Government machinery or a distributing agency, such as co-operative societies, which are in contact with the cultivator, distribution on a large scale would be almost impossible.

Qs. 15 & 16.—The Government Agricultural Research Institute at Pusa has produced ^{Technical aid.} a much superior class of wheat to the usual Indian quality, and has demonstrated that it can be successfully grown in India. We have milled at our flour mills a quantity of this wheat and proved its excellence from a miller's point of view. Its value, from actual results obtained, is about four annas per maund above the value of the Cawnpore quality of wheat. I also consider that countries which import wheat from India would pay the above extra value for this Pusa quality. If, therefore, the ryot can be induced to grow this quality, the value of the Indian wheat crop will be greatly increased. Detailed information is given in bulletin 67, Agricultural Research Institute, Pusa, page 32.

The Indian tea industry benefited very largely, from the work of Government officials, such as Sir George Watt and Mr. Lefroy. Indeed I understand that the establishment of the scientific department of the Indian Tea Association was founded on the original researches made by Sir George Watt and Everard Cotes. Meantime the scientific department is subsidised by the Governments of India, Bengal and Assam. The work of the department has been incalculably beneficial to the industry.

Q. 20.—I consider that Government should erect a tanning factory in Bengal, worked ^{Demonstration} on the most modern methods, and run by first class experts. It would however, in my ^{factories.} opinion, be useless to establish such a factory, unless Government is prepared to protect the industry, to foster which this experimental factory would be established, by the imposition of an export duty on hides and skins. It is possible that when the tanning industry was established, the need for the export duty would not exist, and it might be withdrawn.

Qs. 32 & 33.—I am of opinion that periodical exhibitions in the chief ports and com- ^{Exhibition.} mercial centres of India, would confer great benefits on Indian trade. These exhibitions should be popular in character, and organised to attract as many visitors as possible.

Qs. 25 & 26.—*Witness gave confidential evidence.*

Q. 34.—I consider that India should have trade representatives in all the principal foreign ^{Surveys for industrial purposes.} countries and colonies. These trade representatives should be attached to the British ^{Trade representative.} Consuls, and their duties should be purely advisory.

I consider that men with similar training to that given in the Board of Trade in England should be selected as trade representatives abroad. The question of trade representatives in Great Britain should be dealt with separately, and care would have to be taken not to interfere with existing channels of trade.

Q. 35.—I consider that temporary Commissions for special enquiries are useful, when occasion arises.

Qs. 37 & 38.—Besides publication of lists of imported articles with prices, I would ^{Government} advocate the more general distribution, amongst officials, of information in regard to firms ^{patronage.} who are specially well placed to supply Government requirements. I am of opinion that the want of such information is the cause of petty general contractors buying from direct importers to fulfil the Government indents placed with them. I attach an example (Appendix A) showing the form in which I would suggest the list be issued. This, of course, is not put forward as a complete list. If such a list was circulated periodically, say monthly, to all Government officials, including store supervisors, I think it would be of considerable benefit to all concerned.

Q. 41.—In Bengal and Bihar and Orissa, the question of title forms a serious check at ^{Land policy.} present imposed on industrial development. In many cases, good coal cannot be opened out, as exploiters are unwilling to take the risk attaching to titles, which no solicitors will pass as being sound. I believe it is a fact that no solicitor in Calcutta will pass a Bengal and Bihar and Orissa coal title as absolutely sound. The utmost extent they will go to is to pass it as marketable. The remedy I suggest is that all titles to minerals should be registered with Government, so that parties wishing to exploit the minerals may be able to ascertain to whom the minerals rightfully belong. The difficulty as regards titles is not confined to coal lands, but it exists also in Calcutta and its neighbourhood. Messrs. Shaw, Wallace & Co. have been endeavouring, without success, for the last two years, to purchase or lease a plot of land near Calcutta, for the erection of fertiliser works. We have on several occasions been obliged to drop consideration of a likely piece of land owing to the difficulty of getting a good title. A still greater difficulty has been the opposition of municipalities, from whom license to trade has to be obtained. Fertilisers are classed as an offensive trade, and are consequently regarded with suspicion, but while the opposition is mainly due to religious

scruples, it is much accentuated by ignorance of the conditions of the fertiliser trade. Apparently no appeal exists from the decision of the municipalities.

Training of labour.

Q. 45.—I consider that the best steps to take to improve the labourers' efficiency are to improve the conditions of housing and sanitation, and generally to take more care of the health of the labourers. I understand that the Mining Association is now offering a large prize for the best design of lines for the labourers. On many collieries where malaria is prevalent it is now the custom to give hot tea to the labourers every morning, and quinine twice a week, and this system has had very good results.

Mechanical engineers.

Q. 54.—There is a want of uniformity in the procedure with regard to the use of prime-movers. In the Central Provinces certificated engineers must be placed in charge of prime-movers, whereas in Bengal and Bihar and Orissa no such arrangement is necessary. In the latter two provinces every boiler is inspected and passed for use, and a certificate of working pressure given by an inspector under the Boiler Commission. The boiler is then allowed to be worked at that pressure while such certificate is in force, by the persons owning the boiler. In the Central Provinces a person described as an engineer, who has passed an examination and been given a certificate, is placed in charge of boilers. This class of person is recruited mostly from firemen who, notwithstanding the examination they pass and the certificate given them, possess little or no education and a very small amount of training. The collieries are all in charge of mine managers who have undergone an arduous apprenticeship and who are highly trained and responsible men. They hold certificates usually from Government Boards of Examiners in Great Britain, and in all cases hold certificates granted by the Indian Government. Of the two foregoing systems, the experience of Shaw, Wallace & Co., which extends over 20 years in Bengal and 6 years in the Central Provinces, inclines us to give decided preference to the working of the system in force in Bengal and Bihar and Orissa.

Q. 55.—If it be deemed that certificates are necessary for people in charge of prime-movers then I suggest that Government grant certificates to the colliery managers for all boilers on their collieries, in preference to giving certificates to persons of the stoker class.

Official organisation.

Q. 58.—If an Advisory Board of Industries is constituted, I think that commercial men, appointed by the Chambers of Commerce, should be attached, and that the Collector of Customs should be an *ex-officio* member.

Reference libraries.

Q. 79.—I consider that a library of technical and scientific works of reference should be instituted and that it should be attached to the commercial museum.

Government publications.

Q. 87.—The Ranigunj and Jherria coal fields have been opened out in a large measure on information obtained from Blanford's and Hughes' maps, and other areas have been opened out on publications like those of the Geological Department. The Nazira coal field is being opened out mostly on information obtained from Mr. R. R. Simpson's reports and maps, and Mr. E. H. Pascoe's monograph. The measure I advise in order to increase the usefulness of these publications is to print and publish the monographs in larger number, and reprint further editions of monographs and maps of important areas when the original editions have been sold out.

Certificates of quality.

Qs. 89 to 92.—It would undoubtedly facilitate the business of shippers if Government certificates of quality and weights were enforced and had to be accepted by buyers. When claims are made at buyers' ports, the shippers have to pay on the *c. i. f.* price of the goods, which in certain cases is very considerably greater than local value. Also the shippers have to wait for some considerable time before they know if there is any claim on their shipments which in some cases, may prevent them from entertaining further business in the meantime. Government certificates could probably, with advantage, be enforced for the commodities which are shipped in large quantities from Calcutta, such as jute, gunnies, rice, wheat and linseed, but I doubt whether it would be possible for Government to arrange to grant certificates for the two latter commodities, unless some system of bulking the stuff could be arranged in Calcutta. It would be necessary for such certificates to be compulsory, or some shippers would continue to offer buyers on the old terms, and this would tend to oust shippers who might only be willing to do business on Government certificates.

In regard to these questions, the supply of fertilisers requires some form of control and an enactment, on somewhat the same lines as the British Fertilisers and Feeding Stuffs Act, would answer the purpose. The fertiliser trade is at present in its infancy and no great scope for adulteration exists. As the business expands, other firms, not so scrupulous, may enter the trade, and if adulteration is practised even on a small scale, the general adoption of fertilisers would be greatly hampered, and considerable injury to trade would result. *Witness here gave confidential evidence also.*

Registration of partnerships.

Q. 96.—I am strongly in favour of introducing a system of registration of partnerships. It would undoubtedly tend to promote greater confidence in dealings between European and Indian firms.

Mining and Prospecting Rules.

Q. 103.—*Witness gave confidential evidence.*

Q. 104.—The Government of India has begun to extract on a small scale, quantities of potash salts from the Jhelum salt range, and reports giving full particulars on the subject, have been published. It seems that so far the geological survey of the potash deposits, has not as yet enabled Government to give an accurate estimate of the quantities available. Until such information is to hand it is, of course, impossible for any business concern to take up mining and working of the potash deposits on a commercial scale. The quality so far extracted

is a potash salt of the Kainit type, analysing from 10 to 12 per cent. K₂O. The use of potash as a manure in crops in India has only shown little development up-to-date. Most of the quantities imported before the war from Germany, have been utilised on tea. There is no doubt that potash has a tremendous future in agriculture in India, and a rough estimate based on the requirements of the three crops tea, sugarcane, and cotton, shows that these crops alone could consume 225,000 tons of potash salt.

Q. 105.—Rules are applicable to all cases. Discretion—or less arbitrary application of Forest Department. the rules—would greatly assist development. To take an instance of a case where modification of a rule would benefit both State and individual, I would refer to the present system of the payment of the royalty to the Forest Department on timber on lands acquired under the special cultivation rules. Here a royalty is required to be paid to the Forest Department, but of course the relation of the royalty to the actual sale value of the timber varies with the accessibility of the site where the timber is felled. The timber which is felled is at the disposal of the owner of the grant of land for his own use only. In clearing large areas, however, it is quite impossible to conserve such timber as has a value, and quite 90 per cent. of it, has, at great cost, to be cut up and burnt. Some modification of the present rules might enable this timber to be released for the use of the State, or utilised for the benefit of the individual. In one case in my knowledge, timber contractors offered to clear the land, if they were permitted to take away such timber as they required. But this concession to the lessee of the land was refused by Government, with the result that wood worth many thousands of rupees had to be destroyed.

Q. 110.—The production of sulphur in this country, from whatever source available, General. would enable the manufacture of superphosphates to be engaged in. This question is very intricate, and can only be properly dealt with by experts, and I am not competent to deal with it in this answer. I recommend, however, that Government should institute enquiries into the available resources of India, for the supply of ingredients necessary for the manufacture of superphosphates, and the possible outlet for the principal and bye-products obtained in the course of manufacture.

APPENDIX A.

	Calcutta Agents, etc.	Address.
(s) STOCKS HELD IN CALCUTTA.		
<i>Accumulators.</i>		
Pritchett & Gold	Heatly & Gresham, Ltd. . . .	8, Waterloo Street.
<i>Aerial Ropeways.</i>		
Bullivants, Ltd.	Shaw, Wallace & Co.	4, Bankshall Street.
Ropeways, Ltd.	Bird & Co.	Royal Exchange Place.
Cradocks	Geo. Cradock & Co., Ltd. . . .	2, Mission Row.
<i>Agricultural Implements.</i>		
	Burn & Co., Ltd.	8, Hastings Street.
	John King & Co., Ltd.	28, Strand Road.
	Jessop & Co., Ltd.	97, Clive Street.
<i>Air Compressors.</i>		
Alley & MacLellan	Jessop & Co., Ltd.	97, Clive Street.
Holman Bros., Ltd.	Shaw, Wallace & Co.	4, Bankshall Street.
<i>Air Receivers.</i>		
Alley & MacLellan	Jessop & Co., Ltd.	97, Clive Street.
Holman Bros., Ltd.	Shaw, Wallace & Co.	4, Bankshall Street.
<i>Air Valve Rock Drills.</i>		
Holman Bros., Ltd. (s)	Shaw, Wallace & Co.	4, Bankshall Street.
Hardy Patent Pick Co. . . .	John King & Co.	28, Strand Road.
Siskol	Balmer, Lawrie & Co.	104, Clive Street.
<i>Alloys.</i>		
Eyre Smelting Co., Ltd. . . .	Heatly & Gresham, Ltd. . . .	8, Waterloo Street.

APPENDIX A—contd.

— —	Calcutta Agents, etc.	Address.
	(s) STOCKS HELD IN CALCUTTA — contd.	
<i>Antifriction Metals.</i>		
Atlas Metal Co., Ltd. (s) . . .	T. E. Thomson & Co. . . .	9, Esplanade E.
Hoyt Metal Co. (s) . . .	Balmer, Lawrie & Co. . . .	104, Clive Street.
Magnolia Metal Co. (s) . . .	Jchn King & Co., Ltd. . . .	28, Strand Road.
<i>Artificial Stone.</i>		
Bengal Artificial Stone Co. . . .	Jas. Lumsden & Co. . . .	Entally.
Indian Patent Stone Co. . . .	Bird & Co. . . .	Royal Exchange Place.
Granolithic	Mackintosh, Burn, Ltd. . . .	7, Esplanade E.
<i>Asbestos Goods.</i>		
Leyland & Birmingham Rubber Co.	Burn & Co., Ltd. . . .	8, Hastings Street.
Turner Bros., Ltd. . . .	Turner Bros., Ltd. . . .	Waterloo Street.
<i>Asbestos Tiles (Compressed.)</i>		
Asbestos Manfg. Co. (s) . . .	Heatly & Gresham, Ltd. . . .	8, Waterloo Street.
Turner Bros., Ltd. (s) . . .	Turner Bros., Ltd. . . .	Waterloo Street.
Bells Asbestos Co. (s) . . .	Martin & Co. . . .	4, Clive Street.
<i>Awnings and Sails.</i>		
	W. H. Harton & Co. . . .	Canning Street.
	Ahmuty & Co. . . .	Church Lane.
	Octavius Steel & Co. . . .	Old Court House Street.
<i>Bailing Presses.</i>		
	W. H. Brady & Co. . . .	26, Strand Road.
	Burn & Co., Ltd. . . .	8, Hastings Street.
	Jessop & Co., Ltd. . . .	97, Clive Street.
<i>Belting.</i>		
Angus & Co.(s)	Macgregor & Balfour	15, Clive Row.
Leyland & Birmingham Rubber Co.(s).	Burn & Co., Ltd. . . .	8, Hastings Street.
Hastings Mill(s)	Birkmyre Bros. . . .	6, Clive Street.
Samson(s)	Ivan Jones & Co. . . .	12, Mission Row.
Oxylo(s)	E. Seconde & Co. . . .	1, Vansittart Row.
Gandy Belting Co.(s)	Killick, Nixon & Co. . . .	2, Royal Exchange Place.
Camel Brand(s)	Skippers & Co. . . .	Clive Street.
<i>Belt dressing.</i>		
Cling Surface(s)	Ivan Jones & Co. . . .	12, Mission Row.
<i>Boiler Coverings.</i>		
Mica(s)	J. D. Jones & Co. . . .	Clive Buildings.
<i>Boiler Compounds and Compositions.</i>		
Standardised Co. . . .	Shaw, Wallace & Co. . . .	4, Bankshall Street.
<i>Boiler Fittings.</i>		
J. Hopkinson & Co. . . .	W. H. Brady & Co. . . .	Strand Road.
<i>Bolts, Nuts and Washers.</i>		
	Burn & Co., Ltd. . . .	
	&c. &c.	
<i>Bridges.</i>		
	Burn & Co., Ltd. . . .	
	&c. &c.	

ORAL EVIDENCE, 5TH JANUARY 1917.

President.—*Q.* There are one or two points that I should like to ask you about, and the first is about geological maps. You refer in two or three places in your confidential evidence to comprehensive maps having been prepared of Ranigunj and Jherria coal fields but insufficient maps of other fields?—*A.* I had more particularly in view the Central Provinces.

Q. That has been surveyed by Mr. E. J. Goodwin?—*A.* There are occurrences of coal in various places and we often have had people coming to us with reports that coal had been found and we either found no record of the occurrence at all, or if we had a record, it was not quite accurate.

Q. That map is published on a small scale?—*A.* Yes.

Q. And so also most of the coal maps, perhaps because no topographical maps on a larger scale were then obtainable. Mr. Hayden tells me that he is making an attempt to do all further work on the scale of 1" to the mile, but topographical maps are not obtainable in all cases. For that reason a survey of the Feudatory States of Orissa and certain other areas has been necessarily neglected?—*A.* Of course, there are areas north-west of the present Jherria field across the Jumoni river towards Bokaro-Ramgarh field. The Geological Survey have done all they could, but they are under-staffed. They have always given us all the assistance that they could give.

Q. Of course, a certain amount of work could be done by improving the staff and concentrating on problems of more immediate importance, and for that reason remarks of the kind that you have made are useful indeed. You say: "Frequently people have approached us with samples of various minerals, such as corundum, graphite, chromite and garnets, but we had no means of ascertaining whether the given location of the occurrence had any probability of correctness or otherwise." In a case of that kind do you always refer to the Director of the Geological Survey?—*A.* If the case is sufficiently promising.

Q. And do you find that the Geological Survey are in possession of sufficient information to give a decided answer?—*A.* Yes.

Q. It is a question of merely extending the staff and carrying on the work?—*A.* Yes.

Q. About the question of certificates required for engineers, you suggest that in the Central Provinces it might be well if the managers of mines were regarded as sufficient to control the subordinate staff that may not have certificates. You also say that the certificate granted to a subordinate is not necessarily of much value. Don't you think that it is some protection to the manager to have certificated subordinates?—*A.* I do not think we find it of any assistance.

Q. We have been told that the absence of certificates in Bengal has been of no disadvantage to anybody and that accidents have been very few in number and that the granting of certificates would not improve matters very much. Is that your opinion too?—*A.* We are very much in favour of the Bengal system, that is, the absence of certificates. A boiler certificate is given in Bengal.

Q. Is it correct that there is no reference library in the Commercial Museum here?—*A.* I do not say that there is no library at present. I think there is. I do not think there is any organised library, that is to say, a public library.

Q. What you would like then is a sort of public library with periodicals as well as book of reference to which the public could go without worrying the Director of Commercial Intelligence?—*A.* It would be a convenience.

Q. This question of the leaving of coal for railway support, I suppose, is taken up by the Indian Mining Association?—*A.* The question of railway supports has been taken up and there has been a conference on the point, but I do not think the further point which I have called attention to has been taken up at all, that is, the question of taking out pillars and the admitting of water.

Q. Would not the Indian Mining Association take up that too?—*A.* I think they will eventually.

Q. I am only putting this question to you, because it is not necessary for us to dabble in questions that are being already taken up by an efficient body and represented to the Government of India?—*A.* The question of railway support is important and any help that we could get would be very welcome. (*Witness here gave confidential evidence also.*)

Q. It is very difficult to tackle this problem of support. There is another side to it which is very important?—*A.* It is.

Mr. C. E. Low.—*Q.* You speak of your having sent up exhibits to the Lahore Exhibition and of your failure to retail fuel to the native populace. What steps did you exactly take?—*A.* As a matter of fact, I cannot speak from personal experience as I was at home at the time. But I understand what was done was that we were represented at the Exhibition at Lahore and afterwards that we kept an European assistant up there to try and sell coal in more or less retail quantities up in the north-west. We carried it on for some time and found that we were not selling very much and the expense was very heavy and therefore we gave it up.

Q. Why did you select Lahore? Was there not a considerable handicap in the shape of freight?—*A.* There would be more local consumption up there than there would be in the lower part of India where the climate is hotter.

Q. But it would be difficult to make a beginning unless you could compete as regards price with cow dung? Were you able as a matter of fact to sell cheaper than cow dung?—A. I could not tell you that.

Q. Did the Agricultural Department take any hand in that in order to encourage the use of coal and coke?—A. No. I do not pretend that it was carried on on a big experimental scale. As far as I know, the Agricultural Department were not consulted.

Q. Would you mind letting us have your figures* at which it was sold there?—A. I have not got them here. I can get them for you.

Q. As compared with the cost of cow dung?—A. Yes.

Q. You speak about the idea of co-operative societies dealing in the distribution of coal and coke. Have you in mind any particular area in Bengal or the United Provinces?—A. Only generally.

President.—Q. I think the domestic use of coal would take a new life altogether when we produce a low temperature coal and coke?—A. It is all a question of getting at the ryot.

Mr. C. E. Low.—Q. In answer to questions 37 and 38 you say, "I would advocate the more general distribution amongst officials of information in regard to firms who are specially well placed to supply Government requirements." That would put the Government rather in an awkward position in judging whose name it should publish and whose name it should not?—A. You can do it through the Chambers of Commerce. What I really state is that they should get the names of direct importers and that would not put Government in an awkward position.

Q. In answer to question 34 you say, "The question of trade representatives in Great Britain should be dealt with separately and care would have to be taken not to interfere with existing channels of trade." It has been suggested in certain provinces that there should be a Stores Department in India for Indian articles?—A. Undoubtedly it would be a very great improvement, if the idea is to have one Stores Department in the same way as the Railway Board buy coal for all railways.

Q. I think that was in the mind of the witnesses when this suggestion was put before us. Do you think it would be a good thing?—A. I think it would undoubtedly be a good thing.

Q. With regard to the difficulty about titles, how do you suggest that Government should arrange to guarantee titles?—A. My idea was that if possible all titles should be registered.

Q. There is not only the question of actual possession of the soil which exists in the documents containing the revenue survey but as to which of these proprietors have got mineral rights. Is that your difficulty?—A. It is not only that, but you are never quite certain that when you have bought a place on the titles which are produced somebody else would not come along later and produce another title, and you have got either to buy them out or vacate your property.

Q. This is a very important question and there must certainly have been discussions about it. Could you refer to any representations made to Government or discussions on the subject previously?—A. No.

Witness here gave confidential evidence.

President.—Q. These engineers who are certificated in the Central Provinces, you say, are mostly recruited from firemen?—A. Yes. They have a certificate and when they have it they demand more pay and there is very little work for them to do and one has to pay them Rs. 50 a month. I am referring to the Pench coal fields which have been opened up more or less piecemeal. It means a lot of boilers and a very considerable increase in the cost of staff. When the work is more concentrated the difficulty to some extent disappears.

Q. We have had several people in the Central Provinces, claiming that this system of certificate should be brought into force elsewhere, and in Bihar and Orissa we had evidence that this system should be enforced because they thought it undesirable that men should be placed in charge not only of prime movers but of machinery without any guarantee that they would not spoil it. There is some guarantee provided from the existence of the certificate that the men would not ruin the machinery. The tendency of the evidence elsewhere has been in favour of extending the certificate system while your evidence is in favour of removing the certificate. It came from people who were concerned with machinery. Is there anything essentially different between the boilers used on mines and boilers used in other industries?—A. Take for instance cotton gins. Cotton gins must vary considerably.

Q. The general run of cotton gins is about 50 H. P.?—A. And vertical boilers can be only 20 H. P. It is up to the manager of any factory to see that he engages competent persons. If the manager is responsible he will engage competent persons.

Q. Is this a correct interpretation of what you say?—In the case of a mine you have a qualified man as manager and therefore a man in charge of a 20 H. P. boiler without a certificate is sufficient, but in the case of ginning factories where the manager himself is not certificated, this system of granting certificates for the engineers is really necessary. You discriminate between the two classes of industries in that way?—A. There is that difference. But I think that it is up to the manager of the ginning factory to see that he gets a competent man.

* See Additional written evidence printed after oral evidence.

Q. He may not be, of course, a qualified engineer in the same way as your mine manager is, so that a Government regulation might be desirable in that case and it might be relaxed in the case of a mine where there are a large number of small boilers?—*A.* I am referring to mines. Of course, a certificate is not necessary in Bengal for any industry.

Q. We have been told in Bengal by a witness who ought to be an authority—the Inspector of Factories himself—that these certificates are not necessary and would never do any good even if they were instituted. He was quite satisfied with the present system, that is, the absence of certificates?—*A.* Apparently the examination is so perfunctory that a certificate is of little value.

Q. I am not prepared to accept your argument that you have to pay higher wage for the man in charge of a boiler because he has got a certificate?—*A.* I am not objecting to paying him the wage, but to having to engage many men with nothing to do. We may have eight boilers in a mine and one man may be perfectly competent to look after the whole lot, but we have to engage six or seven.

Dr. E. Hopkinson.—Q. I understand that in Bihar and Orissa every boiler is inspected and passed for use, and a certificate of working pressure given by an inspector under the Boiler Commission. That is the system that you recommend?—*A.* We have found it very satisfactory in our collieries in Bengal.

Q. That is the system that obtains at home?—*A.* I am not aware.

Q. In Bengal the boiler and not the attendant is certified?—*A.* Yes.

Q. In the Central Provinces both are certified?—*A.* Yes.

Q. And the system you advocate is that the boilers should be certified but not the attendant?—*A.* Yes.

Q. Is insurance of boilers against explosion common in Bengal?—*A.* I do not think so.

Mr. A. Chatterton.—Q. The manager of the colliery or factory is responsible regarding the working and maintenance of the thing in a safe condition?—*A.* I take it that it is so.

Mr. C. E. Low.—Q. You say in answer to questions 89 to 92, "It would undoubtedly facilitate the business of shippers if Government certificates of quality and weights were enforced and had to be accepted by buyers." How can it be enforced in foreign countries?—*A.* If they want to buy from India and India can only sell on one system, they have to buy. If you want to buy Australian wheat you have got to accept their certificate of quality. In Australia samples are taken before shipment.

Q. It could be done effectively only in regard to things in which India would have a monopoly?—*A.* Australia has not got a monopoly of wheat. It is also the case with Rangoon rice. It has not got a Government certificate, but all Rangoon rice is sold on a certificate granted in Rangoon.

Q. Have there been complaints in Calcutta regarding jute?—*A.* I am not interested in jute.

Q. You know about wheat?—*A.* Yes.

Q. Is there any objection taken in India [or Calcutta] to the arbitration of the London Corn Association?—*A.* No.

Q. Any other business in which you are familiar—Lac?—*A.* No.

Q. Seeds?—*A.* I have pointed out that there would probably be a difficulty about wheat and linseed because you have got to have some system of bulking before granting certificates. Each of the shippers would have to clean and bulk their wheat.

Q. You talk of Government certificates of quality? Is the Australian one a Government certificate?—*A.* Yes. Nearly all timber is sold on that principle. If you buy Australian timber you have to take their Government certificate.

Q. Do you know what the governing body is? Is it a sort of committee between the Government and the trade?—*A.* I cannot tell you that.

Q. Can you get information* on the subject?—*A.* Yes.

Q. As regards your answer to question 104, you consider that sugarcane and cotton require potash manure as well as tea. What are your reasons for thinking so?—*A.* We have, as you know, a manure department and we have an expert in that department and my information was got from him.

Q. Has he been recommending potash as a manure for sugarcane and cotton?—*A.* Yes. He said that they required a certain amount.

Q. In what parts of India?—*A.* He said, speaking generally, that they required a certain amount of potash. As a matter of fact, tea does not take a great deal of potash.

Q. We have been told as a general rule that potash is not of much use on Indian soils?—*A.* The figure which I give, that is 225,000 tons for all the three crops of tea, sugarcane, and cotton, shows that it is nothing very great.

Q. The Agricultural Department is frequently confronted with recommendations of experts with no extra-Indian experience, as to the manurial requirements of crops, which experience is

* *Vide* Additional written evidence printed after oral examination.

— this country shows to be entirely unfounded as far as the Indian conditions go. If the people find after paying a big price for potash that they are not getting any extra return from their crops they condemn all artificial manures as useless?—A. No artificial manures or potash ought to be used until they are proved to be suitable to a particular crop.

Q. Did you consult the local Agricultural Department whether they were of any use?—A. I am only talking of the possibilities of the future. So far, the fertiliser trade is confined to tea. We do a little for sugar.

Q. With reference to your answer to question 105, the special cultivation rules are for Assam?—A. Yes.

Hon'ble Pandit M. M. Malaviya.—Q. You say, "It would, however, in my opinion, be useless to establish such a factory, unless Government is prepared to protect the industry, to foster which this experimental factory would be established, by the imposition of an export duty on hides and skins." Suppose an export duty is not imposed, do you think that in that case the industry which you want to be developed will not be able to stand competition?—A. I do not think it will be started.

Q. Such protection then is a *sine qua non* for the development of this industry?—A. Yes.

Q. With regard to the improvement of labourer's efficiency, you suggest the improving of the conditions of housing and sanitation and generally taking more care of the health of the labourers. Do you not think that better wages also will help?—A. I do not know that, that came into the particular question.

Q. You suggest means for improving the labourer's efficiency?—A. It does not necessarily follow that increase of wages will help, but I have several times come across instances where when wages were increased the effect was the reduction of the number of days of attendance.

Q. Would you provide any education for these labourers with a view to improve their efficiency?—A. That is a question for the Government.

Q. Apart from any action that the Government might take, don't you think that when you engage a large number of labourers, it would improve their efficiency if they had a little general education?—A. It might, if you employ a large number of labourers at one particular place, but in some cases, for instance, in the tea gardens, collieries, or mills the number of labourers is not sufficient to provide a system of education.

Q. Would it be anywhere under 50 or 100 in any of the cases that you have in view?—A. I do not think that what you suggest would be of any use unless you were employing in one place 2,000 or 3,000.

Q. Even if you have 50 or 100 labourers at one place, don't you think that it would improve them if you provide some education for them?—A. I think the scheme would be impracticable. In many cases the children are not there.

Q. Even the adult labourers could have evening classes to attend?—A. I do not think it would be good.

Q. You say, in answer to question 105, "In one case in my knowledge timber contractors offered to clear the land if they were permitted to take away such timber as they required. But this concession to the lessee of the land was refused by Government, with the result that wood worth many thousands of rupees had to be destroyed." Where was that case?—A. That was a case in Assam. Government were not allowed to grant permission under the rules. There is no injustice about the case, but simply the rules did not provide for that permission.

Sir F. H. Stewart.—Q. About the Advisory Board of Industries do you recommend the formation of such a Board in Bengal for instance? If one is constituted do you think that you would get merchants of position and experience to serve on it?—A. Yes. They would be attached to it. You would find it very difficult to get them as wholtime men.

Q. The heads of large firms are very busy men, and do you think that they will spare the time to help?—A. I think so.

Q. With regard to your answer to questions 89 to 92, was your evidence addressed directly to the Commission, or did it go through the Chambers of Commerce?—A. This evidence was given also in a letter addressed to the Bengal Chamber of Commerce.

Q. Can you develop that a little more? Have you gone into the question with other shippers at all?—A. No.

Q. Have you any notion whether such a scheme would be acceptable to them?—A. Opinions will vary very considerably.

Q. Assuming that it was regarded generally as desirable, how could the Government grant these certificates, what would be the machinery?—A. The same kind of machinery as the Licensed Measures Department.

Q. At present, dealing with the question of weights, you get your licensed measures certificates already through the Chamber of Commerce?—A. Yes.

Q. Do you propose that the licensed measures' department should be taken over by the Government for the purpose of your proposal?—A. It could be done. As a matter of fact, the licensed measures will take your samples now.

Q. How far does the licensed measures' certificate carry you with regard to weight?—*A.* It all depends on the terms on which you sell. You can sell on licensed measures' certificate if buyers agree. There is no compulsion about it.

Q. Take gunnies. Most of the sales are made on terms of arbitration in Calcutta?—*A.* Yes.

Q. Others sell on arbitration in Liverpool or New York, etc., as the case may be?—*A.* Yes.

Q. Is it not a question of shippers getting together, and agreeing on what terms they will sell. You know, for instance, in the case of gunnies—the chamber war bags—the Government have asked to survey them before they are shipped. Government cannot do these surveys themselves?—*A.* Government cannot at present. They have got to do the work through the Chambers of Commerce, or have a department of their own.

Q. But do you think that it is in any way practicable that they should have a department of their own to do this?—*A.* I believe that in other places they have employed commercial people to give certificates.

Q. Do you refer to the Rangoon rice certificate? Do you know what form it takes? Does it deal with quality at all?—*A.* Yes.

Q. Dividing rice into different grades?—*A.* I think they certify that it is representative of the quality as which it is sold.

Dr. E. Hopkinson.—*Q.* Mr. Low asked you about the suggested establishment of a Stores Department in India. Supposing such a department were established, would you suggest that the department should purchase from importing agencies and from home firms who have their offices in India, instead of indenting home?—*A.* I thought you said that the department was to be established for purchasing articles made in India.

Q. Partly so. But I gathered from your evidence that you have an idea that Government might purchase from agents in India?—*A.* What I really wanted to say in my reply was this, that Government, instead of buying direct from the importer, purchases through middlemen, I can tell you that on more than one occasion we have tendered in certain cases to Government departments direct. We have tendered at the same rate to the middlemen and he has tendered at a higher rate and he has got the contract and we have not.

Q. The point I want to put is a new one. Take the care of a manufacturer at home, who has an office in India representing him. Do you think that it is preferable for the purchasing department of Government to make their contract with the office in India or to indent from home in the usual way?—*A.* I should think as a rule that it would be better if they were to purchase in India.

Q. That would be quite a new departure from the present system?—*A.* No. Not quite. We import from home and we very often sell to Government departments out here. In the instance you name the firm out here would hold stock.

Q. The advantage would be that the representatives out in India are more likely to know what is required and to obtain information from Government as to what is necessary?—*A.* Yes.

Q. And you think that the system of buying in India from the representatives of firms at home may be extended?—*A.* Yes. We cannot buy everything in India. You will have to keep a Stores Department at home and the India Office will have to buy.

Q. It will involve a proper system of inspection? Take a piece of machinery that Government wants to purchase. It must be inspected. If purchased here it would be sent out and inspected here?—*A.* It would be delivered, and if it is defective in any way, Government would not pay for it.

Q. To determine whether it is up to specification, you would require proper inspection?—*A.* When Government buy in India they do not inspect before delivery. For instance, we sell drills and drilling tools to Government departments in the Punjab. Sometimes we have them in stock and send them up direct, and at other times we order by telegram from home and they come to Karachi and go up to the Punjab where they are inspected. If there is any mistake or any fault we have to make an allowance or take them back.

Q. Take another example—a pump. Now if ordered at home it is inspected at home at the maker's works. If it is ordered from the representatives of the same firm in India, it will have to be inspected on arrival in India by an Inspector of the Government Purchasing Department?—*A.* You could have a system of inspection undoubtedly. I should think that the system of inspection will be welcomed by the suppliers, because they would have no risk in sending their goods away. The supplier will only be pleased to have inspection before he despatches the goods. For instance, if we get a contract at Cawnpore for some machinery which is made at Calcutta, it would suit us very much better to have inspection in Calcutta before the machinery is despatched than have it at Cawnpore after it is delivered.

Q. That is not my point. I am assuming plant that comes out from home. It must be inspected either at home by a consulting engineer, or in India after arrival by a new department?—*A.* If it is purchased from home it ought to be inspected at home.

Q. In that case, to a certain extent you lose the advantage of the local knowledge of the Indian representatives of the firm at home?—*A.* But you admit that a large number of purchases will have to be made at home too.

President.—Q. If this system were developed in India on a scale that we have not so far attempted, we should in fact reduce the requirements of the home inspection and the whole of the inspection might be concentrated in India and there would be only a few things left of a special kind that could not be got in India for some years, but the other things might very well be inspected here and the local stores purchasing department here would make it its business to keep in touch with the representatives of outside firms?—A. Yes.

Dr. E. Hopkinson.—Q. You suggest that co-operative societies ought to be established to aid the distribution of such commodities as coal and coke and tea. These are consumable commodities?—A. Yes.

Q. That appears to be an entirely new development in the co-operative credit system?—A. I refer to the difficulty of distribution of any article in India by itself. The tea industry is doing it to a very large extent, but it cannot do it all over India.

Q. It is a new proposition?—A. What I was suggesting was that co-operative societies might help in distribution which is a great difficulty at present.

Q. The object of co-operative societies is to provide credit which is necessary in the case of, say, agricultural seeds or manures?—A. The ordinary shopkeeper is rather reluctant to take up some new article which is not at present consumed by the ryot and he has not got the incentive to push it.

Q. You cannot say that coal and coke and tea are new articles?—A. So far as the ryot is concerned, they are.

Q. You speak of the steps taken to improve the labourer's efficiency by better housing and sanitation. Would you subscribe to this proposition that, so far as the jute mills are concerned which is a very highly developed industry, the mill-owner has found that improved sanitation and better housing actually pays him?—A. I am not interested in jute industry at all and I cannot speak about it. For instance, in the tea industry the improvement in the conditions there has been enormous in the last ten to fifteen years and undoubtedly the greater attention paid to this question has been of very great advantage indeed to the industry.

Mr. A. Chatterton.—Q. You say, "Government should erect a tanning factory in Bengal, worked on the most modern methods, and run by first class experts." Would that be for the manufacture of leather to meet the requirements of the country or for export?—A. For both. You will have to manufacture leather required for the country at first, but you want to take the business hitherto done by Germany.

Q. Have you seen the Bengal National Tannery?—A. No.

Q. You say, "It would, however, in my opinion, be useless to establish such a factory, unless Government is prepared to protect the industry by the imposition of an export duty on hides and skins." Is that because the price of hides is too high?—A. I do not think that unless it was protected in that way you would get capital to start the industry on a large scale.

Q. What is the object of the export duty—to reduce the price of raw materials?—A. You will be able to turn out leather cheaper than Germany who would have to pay more for the hides exported.

Q. Is the hide trade in Calcutta or India of sufficient importance in the markets of the world so that you can, by the imposition of duties here, raise the price outside the country?—A. It would undoubtedly affect the price. Supposing you put on a duty of 20 per cent. or some fixed amount which is equivalent to about 20 per cent. you might raise the price by five per cent.

Q. Don't you think that the establishment of a demonstration factory by Government in this case would be an undue interference with the two existing tanneries which have been started?—A. It would be quite easy not to interfere.

Q. One of them is turning out good leather?—A. It would be extremely easy to avoid any injury to them.

ADDITIONAL WRITTEN EVIDENCE (submitted after oral examination).

Supplementary Answers to Questions.

(1) *Fuel at Lahore.*—The price at which we were able to supply soft coke at Lahore in pre-war times, i.e., before the increase in railway freight rates and the inflated values of fuel was Rs. 15-12-0 per ton or 9 annas 4 pies per maund. The price of cow dung at Lahore varies from 5 to 6 annas per maund.

(2) *Government certificates for produce in Australia.*—I beg to forward to the Members of the Industrial Commission for their information copies of letters from a leading firm in Melbourne and Perth, together with a letter from the Director of Agriculture in Victoria to the Melbourne firm. These letters give full information as regards the methods adopted in Australia for the granting of Government certificates for produce exported, and for the selection of Inspectors of Produce.

Copy of letter, dated 1st March 1917, from Messrs.

Melbourne, to Messrs.

Shaw, Wallace & Co., Calcutta.

We are in receipt of your favour of 5th January with reference to the official Government inspection of products exported from Australia.

We enclose herewith copy of letter from our Victorian Department of Agriculture which will explain to you the methods of inspection and appointment of inspectors in connection with shipments of agricultural produce.

The inspection and appointment of inspectors for timber export is on the same lines, but in the case of timber each piece inspected is branded with Government stamp. In agricultural produce the individual packages or bags are not marked by the Government, and a certificate is given for the whole quantity shipped under a certain brand in the vessel.

In wheat the inspection is made at the ship's side, but in other commodities, such as potatoes, inspection is made while the produce is being prepared for shipment in seller's store or at railway siding adjacent to wharf.

If there is any further information we can give you, please let us know.

Copy of letter, dated 28th February 1917, from the Director of Agriculture (Victoria)

Melbourne, to Messrs.

Melbourne.

In reply to your letter of the 17th February 1917, I beg to inform you that grain and other farm products for which Government certificates for quality only or quality and weight are issued, are first examined by expert Government officials and the method of examination in the case of wheat or other grain is to draw a sample from each individual sack and by it judge the contents. The inspectors are also instructed to see that the bags are "sound and fit for shipment" unless stipulated that bags must be new.

The examination is made either at the vessel's side while loading or at the store while loading into truck or lorry for conveyance to vessels; in the latter case, ship's receipts are taken as proof that the contents of these particular trucks or lorries have been discharged into the vessel.

Weights shown on the Government certificates are taken from Government Railway Weighbridge certificates.

When examining chaff, etc., only a percentage of the bags are tested, number being left to the inspectors' discretion, a proportionately greater quantity are usually tried in a small parcel than in a large one.

In making appointments to the staff of Government inspectors of farm products applicants' previous experience as grain buyers or handling produce and their knowledge of the various farm products and quantities of same, together with a knowledge of fungus diseases, insect and weed pests relating thereto, is taken into consideration in connection with their suitability in other respects.

Applicants have to submit to an examination, and if their knowledge and experience are found to be up to the required standard, they are eligible for appointment.

Herewith is a copy of the syllabus of the subject of the last examination. This Department does not issue certificates for timber exported.

EXAMINATION FOR INSPECTORS OF GRAIN AND FARM PRODUCE.

Syllabus.

1. *Subjects* for examination will include written, oral and practical tests and candidates will require to have a knowledge of—

- (1) Farm produce in all forms.
- (2) Structure of plants, roots, stem, flower, fruit seed.
- (3) Identification of the more common varieties of the usually grown cereal grains, and a knowledge of their characteristics.
- (4) Identification of seeds and plants of wheat, barley, oats, maize, sorghum, amercane, millet, beans, peas, clovers, lucerne, rape, turnips, onions, potatoes, flax.
- (5) Identification of the seeds and plants of the commoner weeds.
- (6) Grading and judging; and methods of marketing seeds and farm produce.
- (7) The relative nutritive and commercial values of food-stuffs.
- (8) Quality and characteristics of fodders—hay, chaff, grain, meal, flour, bran, and the common adulterants of these.
- (9) Diseases of farm crops, *e.g.*, smut, bunt, rust, mildew, dodder.
- (10) The Pure Seeds Act and Chaff and Stock Foods Act, and the regulations thereunder.

2. *Evidence of ability* to verbally expound details of the above matters and to carry on inspectorial duties in a tactful and educational manner will receive special recommendation.

3. *Text books*.—No special text books are prescribed, but candidates may consult the following with profit:—

- (1) Year Book of Agriculture.
- (2) Journal of Agriculture.
- (3) Fream's Agriculture.

Copy of letter, dated 12th March 1917, from Messrs.

Perth, to

Messrs. Shaw, Wallace & Co., Calcutta.

Inspection of Australian Wheat.—Replying to yours of the 5th January. As you know, all wheat exported from Australia at the present time is controlled by what is known as the Wheat Marketing Committee. Now, in West Australia the Wheat Marketing Committee is entirely a different body to the Department of Agriculture, although both are under Government control. The Wheat Marketing Committee does the shipping, and the inspectors attached to the Department of Agriculture survey and issue certificates of wheat for export.

This wheat is really examined twice; when the farmers deliver the wheat to the agents for the Wheat Marketing Scheme in the country, each bag is sampled by the agents' inspectors and if the appearance is up to the f. a. q. standard, it is then sent down to the port for shipment; as the wheat is being loaded into the ship, an inspector appointed by the Department of Agriculture stands by and examines with a grain trier about one in every six bags, and the samples so drawn are retained, and at the end of the loading period these samples are all mixed together, and the weight is ascertained to see if it comes up to the f.a.q. standard.

The Government officials who do this have undergone no prescribed training to fit them for these duties, although in most cases, these men received their knowledge of their work in private employment sampling wheat on behalf of local flour mills. No surveying for shipment is done by private persons.

Trusting this is the information you require.

WITNESS No. 174.

Mr. D. Meik.

MR. D. MEIK, Assistant, Messrs. Graham & Co., Calcutta.

WRITTEN EVIDENCE.

Technical and
scientific
departments.

Agricultural Department of Bengal:—

Staff—

- 1 Director
- 2 Deputy Directors
- 1 Fibre Expert
- 1 Economic Botanist
- 1 Agricultural Chemist

Of this number there are absent at present, one Deputy Director on military service, the Chemist whose services have been placed at the disposal of the United Provinces Government as Opium Expert, and the Botanist who is away on leave. Of the total staff three are executive officers and three are specialists.

This staff is altogether inadequate to grapple effectively with the agricultural situation in Bengal. We have here an extraordinary situation, in that the gigantic task of reforming and improving the agricultural condition of a province of 84,000 square miles, of varying soils and conditions, supporting a population of over 46,000,000, is left under ordinary circumstances to three men. At present this work is being carried on by two. These gentlemen are sound practical agriculturists and in every way fitted for the positions they hold, but these two men are required to do the work of a dozen and it is impossible for them to accomplish the task successfully, however good they may be. The only highly trained help they are allowed are three specialists, two engaged in important purely scientific branches and the third on work specially required by the conditions of the country. These specialists have no share in the administration of the department so that on the shoulders of two men falls the entire burden of coping with a situation bristling with difficulties urgently requiring solution.

Besides the above men the Director and Deputy Director have to help them a staff of Indians, trained for the most part in agricultural institutions or on experimental farms in this country and many of whom are quite unfit to render the effective aid that men in their position should. The training these men have received is not of a high order. Many of the agricultural colleges in this country are giving a training that is very deficient theoretically and more so practically, whereas the training obtained on experimental farms is of a very low

order indeed. These men certainly fulfil requirements as far as routine is concerned but the majority of the Indian staff cannot bring to bear on their work a technical and practical knowledge of a standard required in men of their position. Their training does not allow of this.

The Agricultural Department can be said to be divided into two branches, (1) the executive (2) the specialist. The specialists are confined within limits, each working along his own special line. The results obtained by their researches are handed over to the executive branch whose duty it then becomes to apply these results practically and, if successful, to demonstrate and spread the knowledge of them among the people. The existing channels for disseminating this knowledge are two large farms at Chinsurah (210 acres) and Dacca (353 acres), and five small farms ranging in size from 20 to 63 acres and situated at Kulimpong, Burdwan, Rajshahi, Burirhat and Rangpur. There are also Agricultural Associations consisting of a few members on whose lands demonstrations are carried out. A few demonstrations are made at "melas" and to members of co-operative societies.

Each of these demonstration farms is surrounded by an enormous territory, so large as to make it impossible for it to serve as a place for demonstrating improved methods of agriculture to the agricultural population of the territory. Of these farms four are in the Rajshahi Division serving an area of 18,000 square miles and a population of about 10,000,000, two are in the Burdwan Division serving an area of 14,000 square miles and a population of about 9,000,000 and one is in the Dacca Division serving an area of 16,000 square miles and a population of about 11,000,000. This means that 30,000,000 of the people of Bengal have meagre facilities for gaining agricultural knowledge while the remaining 16,000,000 have practically none.

From the foregoing we see that Bengal has a small Agricultural Department spread over an enormous province with its centres of activity surrounded by territories far too large to be dealt with effectively by each centre, with a consequent lack of proper supervision of the work carried out, resulting in the department not being able to reach the people it should and in its usefulness being greatly impaired. This state of affairs has resulted on many occasions in failure in adapting its recommendations to local conditions thereby bringing its recommendations into disrepute. Its experimental work has often been of only local application and being understaffed and with insufficient means results obtained have often been pigeon-holed instead of being brought into practice. It has certainly made progress and done some good work but having had to work at a great disadvantage the net results attained have been very small indeed. These difficulties must be overcome or the department as such prove a miserable failure.

To deal successfully with the agricultural problem there are two classes of people, the Agricultural Department must reach by direct means, (1) the zaminder, (2) the rayat. It is out of the question to think of dealing with one class only and of hoping to improve the situation as one is entirely dependent on the other. To reach these two classes and to deal effectively with the problem the Government must be prepared—

- (1) to increase their staff of highly trained scientific agriculturists ;
- (2) to place sufficient means at the disposal of the department to carry on its work properly ;
- (3) to establish an agricultural college on up-to-date modern lines ;
- (4) to give elementary agricultural education in schools ;
- (5) to increase the number of farms so that the population of each district in the province has the opportunity of taking full advantage of the demonstration work carried out ;
- (6) to work in closer union with the co-operative societies.

Of these recommendations No. 1 should be attended to first and the deplorable lack of properly trained scientific agriculturists made good. Without them it will be hopeless to attempt any improvement. Having got these properly qualified men the department must not be starved but supplied by Government with the means to carry out the policy that may be deemed best for the country.

There should be an agricultural college properly equipped and staffed to give men of the domiciled and Indian communities a thorough scientific and practical training in agriculture. It would be possible to get from an institution conducted on sound lines trained men capable of doing justice to the positions they hold in the department, and men who could work their own or others estates and be missionaries of better agriculture throughout the province. In addition to the college there should be a main experimental and demonstration farm, on the scale of the Dacca farm, in every division where the initial trials of all new improvements and results of researches should be made. There should also be demonstration farms in every district where trials should be made on a scale that will demonstrate to the people the practical adaptability of improvements and methods. These farms should be for purely demonstration purposes and not experimental.

It is very important that in an agricultural country like India, where the majority of the pupils in schools in the country are of the cultivator class, the young should get a training that will better fit them to work their lands in the future. A course of simple elementary agriculture would not only help to spread knowledge but would pave the way to accepting improvements that are rejected at present through ignorance and prejudice.

The idea of co-operation is making headway in Bengal and co-operative societies are springing up all over the country. At present there is no provision made for the proper supervision of aid given or improvements in agriculture recommended by the societies. In this matter there should be closer union between the Agricultural Department and the co-operative societies and the department should aid the societies by allowing their officers to superintend their agricultural activities. If they don't and the agricultural work of the societies is carried out by untrained men the chances are that great harm will be done and progress in agriculture retarded.

If the activities of the Agricultural Department were extended as suggested above, enormous benefit would not only be derived by the primary industry of India but also by industries allied to agriculture. There are mills manufacturing oil cake and bone-meal that are shipping these commodities out of India (27,320 tons in 1915-16 from Bengal and a total of 210,300 tons from British India) because the Indian agriculturist has practically no knowledge of their use. For the same reason there are mineral deposits left practically untouched. There were also 9,000 tons of other manures exported from India in 1915-16. If an improvement was made in Agriculture it would mean the development of these industries and others that would be brought to light by research and the retainment in India of valuable products that would enrich her soil instead of being shipped away to her loss. Commercial firms can do a lot towards helping Government in connection with the development of agriculture but as they have not the facilities at their disposal that Government has, it is impossible for them to undertake the education of the agricultural population or the demonstration of improved methods throughout the province. The scientific departments of commercial firms dealing in agricultural requirements are specialists in their own lines and it is possible that from time to time they will obtain results from their researches that would be of value to the country and should be known. These firms have not set out with the sole object of making enormous profits and if the Government would take this view and invite their co-operation great progress would be made in the development of agriculture and its allied industries.

ORAL EVIDENCE, 5TH JANUARY 1917.

Mr. C. E. Low.—*Q.* You have taken special interest in the work of the Agricultural Department. Is there any special reason to bring you in contact with that department?—*A.* I am running the Fertiliser Department of Messrs. Graham and Company and in that connection I come into contact with the Agricultural Department.

Q. What special manures are you interested in?—*A.* Bone manures, oil manures and basic phosphates and artificial manures from different parts of the world.

Q. Your sales are at present limited to planters of tea gardens?—*A.* Principally, yes.

Q. Do you get a large demand for ordinary cultivation in Bengal?—*A.* The demand has not been great but a number of enquiries have been coming in from not only parts of Bengal but also from the United Provinces, Punjab and other places, and it seems to me that the demand will grow.

Q. They show signs of increasing?—*A.* Yes.

Q. The criticisms which you make on the Agricultural Department refer more particularly to Bengal. Don't you think that since Mr. Milligan took up the post of Director things are on a better basis? Do you know any thing of Mr. Milligan's plans?—*A.* I had an interview with Mr. Milligan during the week, the first time that I have been able to discuss the subject with him. I know now more of his plans than I did before.

Q. Have you any ideas as to how you would get the people to take up fertilisers? Would you rely mainly on the Agricultural Department or would you work with them?—*A.* I should work with them.

Q. Have you any idea as to the method?—*A.* Of course it is impossible for us as a commercial firm to go direct to the ryot throughout the country and we will have to rely on the Agricultural Departments spreading the knowledge of the use of fertilisers. We could also help them to a certain extent in that and then, as far as getting to the people is concerned, I think the best way to do it is through the co-operative societies.

Q. Has anything been done in connection with the co-operative societies or is it only in the region of discussion?—*A.* As far as we are concerned we have taken definite action in one case so far.

Q. What were the arrangements in that case?—*A.* I undertook to supply this co-operative society with fertilisers. I gave them six months credit. They distributed it among the more intelligent ryots who were likely to use them properly, and who were to pay the money back when the crop was in. I undertook to give as much help as possible from the agricultural point of view to the members of the society. The fertilisers used were nitrate of soda and basic phosphates.

Q. For what crop?—*A.* They were trying it on both jute and paddy.

Q. There was nothing done so far as you know by way of co-operative finance?—*A.* I do not know anything about that.

Q. With reference to what you say about demonstrations do you see any objection to men of the labouring classes, fairly intelligent labourers, being given short courses in

particular subjects and then put under the orders of superior officers to help the cultivators in places which the superior officer has visited?—*A.* I think that would be a very useful scheme indeed.

Q. What fertiliser do you think has the biggest future before it?—*A.* I think bone meal.

Q. Is saltpetre being used?—*A.* As far as I know this is being supplied only to tea gardens. Not much outside of them. A certain quantity of it is being used by general cultivators.

Q. Have you gone into the question of the Indian basic slag at all?—*A.* Yes. I am not prepared to make a definite statement about it. I have only had one Indian basic slag submitted to me and that was very poor.

Q. Very low in phosphorus?—*A.* Yes. That will have to be put right.

Q. When you sell these things through the Agricultural Department do they take any steps to see that the stuff is up to the proper standard?—*A.* They protect themselves in that respect.

Q. And what about the tea planters? Have you any arrangement with the Indian Tea Association or the scientific officer?—*A.* In selling the fertilisers I say that the contents are so and so. The planters have their own scientific department to refer to.

Q. They are in a position to protect themselves?—*A.* Yes.

Q. Do you believe in the system of Government certificates of quality?—*A.* Yes. In this country there is absolutely no legislation whatever to prevent any dealer in fertilisers from placing on the market whatever he pleases. There is nothing here on the lines of what we have at home. So far as the Agricultural Department and Indian Tea Association are concerned, they are able to protect themselves and if the co-operative societies are properly organised they can protect themselves, but the small landholders and zaminders are left open to be swindled by unscrupulous people.

Q. The cultivators are beginning to know the value of fertilisers and there will be an increasing demand with the result that there will be great adulteration if the trade is left to Marwaris and the ordinary shopkeepers. Do you think that some Government precaution ought to be taken?—*A.* I do.

Q. If it is taken in the present state of the trade, would it cause inconvenience to anybody?—*A.* Not that I know of.

Q. How does the English Act work? Is it an offence to sell without a certificate?—*A.* The man has to make a declaration that the fertiliser contains certain percentages of this and that and then they have got a table of standards and the man has to come within those limits. I think it is left to the consumer to bring the matter up.

Q. The mere selling of fertilisers without a certificate is not a misdemeanour in itself?—*A.* I am not quite certain. I sent home for a copy of the Act and have only just received it and have not had time to examine it carefully.

Q. As an outsider to both departments, namely, the Co-operative Department and the Agricultural Department, have you formed any idea as to whether they should work in closer contact?—*A.* I have said that they should work closer.

Q. You say that things are much better now in that respect?—*A.* I expect great improvements in the future.

President.—Q. About the certificates of quality we had this point before us of a fertiliser being sold in the form of a mixture, the mixture being of a kind that was self-contradictory. That is to say, a mixture applicable to one soil would be mixed up with a fertiliser of another kind leading to a waste of money in the case of a particular crop. Do you think that legislation would be necessary compelling a seller of a fertiliser to observe rules in this matter?—*A.* I would much prefer it. Those are the lines which we are following.

Q. That would not interfere with the trade if Government insisted on clean fertilisers being sold and not mixtures?—*A.* I think it would be to our advantage.

Q. It would be necessary for the seller to guarantee certain contents and if the material were found otherwise it would be a misdemeanour?—*A.* That is what they do in Australia. They have to come up to a certain standard fixed by Government and the seller has to put on each bag of fertiliser a declaration that it contains so much of this and so much of that.

Sir F. H. Stewart.—Q. It would be for the purchaser to find out what would be suitable for his particular soil?—*A.* Yes.

Q. The certificate of quality would only be a statement of the contents. It would not be in any sense a testimonial?—*A.* Oh, no.

Hon'ble Pandit M. M. Malaviya.—Q. Where did you acquire your knowledge of agriculture?—*A.* In Australia.

Q. How long have you been connected with agriculture?—*A.* For about 10 years.

Q. For how many years have you been connected with this firm which is dealing in fertilisers?—*A.* A few months. I was before that in Allahabad at the Agricultural College there.

Q. Have you had any experience of these trained Indians who are working in the Agricultural Department?—A. Since I have been out here I have had a good deal to do with them.

Q. What is the kind of education that they have received? Are they University men?—A. They are mostly men who have gone up to the entrance standard and then had their training in one of the agricultural colleges.

Q. And in other agricultural institutions?—A. Some of them.

Q. Have you seen any of the Pusa trained men?—A. Yes, I have come across them. I cannot specifically point to any of them at the present moment.

Q. You suggest that there should be much better provision for imparting agricultural education, and you want colleges not so much for research work as for imparting a knowledge of scientific agriculture as far as it is known?—A. Yes.

Q. Do these co-operative societies actually recommend any improvements in agriculture?—A. They refer to the Agricultural Department and the Agricultural Department makes the recommendations. But though the recommendations are simple, there is no supervision to see that the instructions are properly carried out. The co-operative society men are not men trained in agriculture. That needs looking into.

Q. You would have a trained inspector going out to advise as to the use of the fertilisers?—A. There should be somebody to look after that part of the society's work, to see that the agricultural part of the scheme is carried out properly so as to benefit people.

Q. Do you know of any institution in the country from which you could get men trained for this purpose?—A. It is difficult to answer that.

Q. So far as you are aware?—A. It is possible that you can get a few men from any of the institutions who will be capable of taking up that position. They are few and far between.

Q. What is the system of agricultural education in Australia? Can you tell us briefly?—A. It is part of the general course up to a certain standard. They have what they call Agricultural High Schools. They are connected with the ordinary schools but they form a separate department where students who show a particular aptitude for agriculture are selected and sent.

Q. Are farms attached to them?—A. Yes, and then they have agricultural colleges in the States. Some have two and some three, according to the size of the State, and the Universities have agricultural departments so that a boy can be connected with agricultural studies from his early years right up to the end of his University career.

Q. Are there a large number of farmers attracted to the schools?—A. Nearly all the agricultural schools have a large proportion of farmers' sons.

Sir F. H. Stewart.—Q. Do you think it would be advisable to place any restriction on the exports of fertilisers, such as bone meal, oil cake, etc., with a view to popularise their use in India?—A. You cannot gain your point in that way. The point is that if the people were educated in the use of them they would be utilised here instead of being shipped away to the country's loss.

Q. Would that not be a lengthy process? Would you not say in Japan people know the value of bone meal and that they will pay very much higher prices than people in this country will do for many years to come?—A. I do not think the difference is so great. We have shipped stuff to Japan ourselves. We are getting practically the same price in this country.

Q. Could you tell us something more about the Government certificates of quality in Australia?—A. I can say something regarding wheat. I do not know if the Federal Government has taken that up now but in Victoria the Agricultural Department has fixed a f. a. q. standard. They get sample lots from all over the State. In Melbourne the Government Department officers empty the whole lot and they go through an elaborate process of mixing and this particular mixture is taken as the standard. The bushel was measured out from that and the standard was determined according to the amount that was in that bushel.

Q. Were certificates granted in all cases where there were shipments from Australia?—A. Yes.

Q. If the certificates were granted was that the end of the whole matter? No claims could then be made?—A. I do not know sufficiently about that.

Q. What about the wheat that did not attain to a certain standard? It was made up again?—A. They have got various grades such as f. a. q., good, seconds, and so on.

President.—Q. Is that the only standard the weight per bushel?—A. They have samples of different qualities. The experts would be able to tell the grade from them.

Sir F. H. Stewart.—Q. Is this standard fixed by Government or are the dealers represented also?—A. They have one or two representatives.

Q. You mean the shippers themselves?—A. There is a sort of Board. Government does not do anything independently. These people work with the Government.

Q. Do you think that a similar system would work here?—A. I cannot say. It would be a very much more difficult business here than in Australia. I have thought of it a number of times but there are difficulties in the way. It would not be such a simple matter to work here.

Mr. A. Chatterton.—Q. Are there any Indian firms engaged in the fertiliser trade?—A. I know of a couple of firms.

Q. How many European firms?—A. They are practically four.

WITNESS No. 175.

Mr. G. D. Hope.

MR. G. D. HOPE, PH.D., B.Sc., F.C.S., *Chief Scientific Officer, Indian Tea Association, Calcutta.*

WRITTEN EVIDENCE.

The scientific department of the Indian Tea Association has now been in existence for 16 years but during that time the staff has never been large enough to cope adequately with the twofold activities—namely, advisory work and research—which are almost inevitably forthwith demanded of such a department, from the moment it is established (and which has been demanded in this particular case) when it is supported largely by funds subscribed by commercial concerns. Technical aid.

The tendency has been, in practice, to devote by far the greater part of the time at the disposal of the officers of the department to advisory work, and the time put aside for research has always been of necessity largely interfered with by routine work of an advisory character, which cannot possibly be avoided when this character has once been given to the work.

It is firmly my opinion that since the inception of the department the material benefit to the tea industry which has been derived by making use of the officers of the department in an advisory capacity, has been very much greater than is ever likely to have been obtained from the results of research work alone, by a staff of the same numbers.

Although individual planters are with few exceptions ready to listen to the personal advice and suggestions of European officers of the department, they are not usually so susceptible to information imparted through the medium of publications. Consequently the advisory work of the department, which consists in touring and lecturing in the planting districts, interviewing representatives of agency firms and others in Calcutta, keeping up a large correspondence with planters, and publishing information not necessarily derived from original research, should not be curtailed to make time for research, but should unquestionably form an essential separate activity of the department, which, to suit its particular needs, should be also adequately equipped with a staff capable of carrying out research into the various branches of the industry; and this research should go on without the discontinuity which is inevitable when each officer has to act in a dual capacity. This necessity for advisory and research work is similar to that for demonstration and experiment respectively in the case of ryot's crops, and progress is best effected by confining the work of each officer to one branch.

At the present moment the staff of the scientific department of the Indian Tea Association is not large enough to cope satisfactorily with both branches of work. If it were to act in an advisory capacity only its value would be quickly lessened owing to lack of material with which to advise; if in a research capacity only, the large immediate monetary value of such advisory work as it is carrying on now and of that which it could carry on much more effectively in the future, if it were adequately staffed for both activities, would be lost.

In the present condition of the tea industry, when the price of tea has been high for several years, and money has been forthcoming for all operations which conduce to increases in the size of crops, the Association would not have been justified, in my opinion, in doing otherwise, with the pre-war staff of five European officers, than directing them to act chiefly in an advisory capacity; but the industry as a whole would be well advised to spend in the future a much larger sum in obtaining scientific aid, and the necessity for more research work is now more than ever evident.

Witness here gave confidential evidence.

ORAL EVIDENCE, 5TH JANUARY 1917.

Research abroad.

Witness here gave confidential evidence.

Mr. C. E. Low.—Q. Have you an experimental station?—A. Yes.

Q. What do you do with regard to the sale of fertilisers to planters? Do you advise them?—A. I advise them as to the choice of fertilisers.

Q. With reference to the soil and climate?—A. With reference to the soil and climate of the tea districts of North-East India.

Q. Your work extends to the Doars and Assam?—A. Darjeeling, Cachar, Sylhet, Assam and the Doars and Terai.

Q. Do you get fertilisers sent to you for analyses by planters?—A. For a short time our department undertook analyses of fertilisers and soils for a fee but the idea of our doing so was given up because our staff is small and the time so occupied can more profitably be devoted to research.

Q. It could be done just as well in Calcutta?—A. Yes.

Q. Supposing a fertiliser was sent by a planter to Messrs. Smith, Stanistreet & Co. for analysis, would you check the analysis?—A. If I doubted the accuracy of an analysis submitted to me as a guide to the choice of manures, or for any other reason, I would, in the first instance, probably draw the attention of the particular planter or a proprietor who had sent me the analysis, to the matter, and would ask him to have it re-analysed and if necessary I would, with his consent, take up the matter with the Indian Tea Association. A sub-committee of this Association deals with the work of the scientific department.

Q. What are the fertilisers which are mostly used by tea planters?—A. Besides cattle and lime manures obtained locally, lime, superphosphate, basic slag, sulphate of ammonia, sulphate of potash, oilcakes, animal and fish manures are used very largely; nitrate and sulphate of potash in smaller quantities. The use of other artificial manures is restricted to very small quantities.

Q. Do you find, as a matter of fact, that these have produced satisfactory results?—A. When used judiciously and in the proper connection with other field operations manures in most cases give excellent results.

Q. Do you find that fertilisers are recommended in a way that leads the planter to use them in unsuitable conditions?—A. About two or three years ago at a time when more extended use of fertilisers was taking place rapidly there was a determined effort on the part of several suppliers to sell mixtures of manures often described by such names as "standard mixtures" and the like, and my department was against any proposal to use such mixtures on a large scale, our reason being that with such differences of soil and climate as obtain in the tea districts of North-East India individual planters were not likely to get the best results by buying in that way. Mixtures said to have the special merits of improving quality, and crop, of producing special development of the frames of bushes, and so on, were actually advertised by those who could have known nothing in detail about the soil and climate of individual estates nor did they make reference to them in their advertisements.

Q. Has that now been dropped or is it still carried on?—A. It is still carried on to a small extent, but it has largely been dropped.

Q. Have you any experience of certificates of quality for manures under the authority of Government?—A. I have no experience of that.

Q. Do you know what the law is in the United Kingdom?—A. Not in detail. I had very little experience of agriculture in England before I came here.

Q. What is your idea as to the action that might advantageously be taken by Government in this country?—A. I think that suppliers should be permitted only to sell under a license granted by Government.

Q. Including not only importers or manufacturers, but up-country agents, small cultivators, small bazar men?—A. I see no particular difficulty in arranging that they should only be allowed to sell if they have a license.

Q. Like poisons or fireworks?—A. If there is any charge connected with it, it might be nominal in the case of the small seller.

Q. How would you use this license with reference to the purity of the stuff sold?—A. If any case of impurity occurred that license will be liable to be taken away.

Q. And who do you think is a suitable authority for inspecting it?—A. I think a whole-time officer would have to do it, if it refers to the whole of India.

President.—Q. In that case, would it not be better, if it does not interfere with private enterprise, to arrange for fertilisers to be distributed through the Agricultural Department? The Agricultural Department would actually become the purveyors of fertilisers of known qualities; they would be in touch with co-operative societies; the people would have greater confidence in the fertilisers; and the extension of fertilisers would be developed. On the other hand, there would be a certain amount of interference with private enterprise which, so far as can be seen, has not established itself sufficiently well?—A. At present the use of large quantities of certain classes of fertilisers is practically confined to estates under European management. Under your arrangement would planters be prevented from buying manures otherwise than through the Agricultural Department?

Q. There would be recognition of your department's certificate as equivalent to Government's. In the case of the ordinary ryot, who is the man that we want to use fertilisers on a very large scale, he will always be slow and timid about using fertilisers; he will have no confidence; and there will be a set-back if he thinks that a fertiliser is fraudulent or deceptive?—A. My work brings me in no manner of way in contact with the question of dealing with the ryot.

Q. You could not form a mental picture of what the conditions would be?—A. I can imagine that an arrangement such as you suggest would be helpful to ryots.

Q. Am I correct in assuming that fertilisers if properly applied are going to alter the whole phase of agriculture in India and that we are going to solve the agricultural problem of production in that way very largely?—A. I think so personally. I believe that fertilisers are going to play a very important part in the agriculture of India.

Q. Big enough to take it up as a serious proposition?—A. Certainly. In regard to tea, I was very much struck in Ceylon by what appeared to me to be the case, that the suppliers of

fertilisers had got things more into their own hands than was necessary or desirable. I think this is less so now than it was some years previously. This is a thing to be avoided if possible in India.

Q. In the case of planters, they would naturally consult you in the matter of using a new fertiliser and at the meetings of the Association you would be in a position to give them a general warning as to their effect, but the ryots are not so easily gathered together and taught?—A. Yes. Exactly.

Mr. C. E. Low.—Q. Have you seen anything of cultivators on the land of planters?—Have they shown any sign of using fertilisers?—A. Such experience as I have had shows that they have done but little.

Q. Do you notice if the Indian tea gardens use artificial manures?—A. Comparatively little. But I think they do so to some extent in copy of their European neighbours.

Sir P. H. Stewart.—Q. Are the committee of the Indian Tea Association in possession of your views about advisory and research work?—A. Yes.

Q. Do you think they are going to increase your staff?—A. I think their attitude will be one tending that way, as soon as the War is over.

Q. It is on the research side especially that you want an increase of establishment?—A. Yes. When one officer is acting in two capacities, and the department, as a whole, is short-handed, the research work is the first to suffer.

Q. If the research side of your staff is strengthened you could continue to superintend both the advisory work and research work?—A. I think it would be possible, if the staff were increased for the head of the department to attend to both.

Q. You are entirely under the Tea Association?—A. Yes.

Q. There is no Government connection or Government control?—A. No. There is a subsidy from the Government of India, and from the Governments of Bengal and Assam. The Indian Tea Association and the branch and the affiliated Associations provide funds which make up the balance. No money is provided from the Tea Cess Funds.

WITNESS No. 176.

Mr. F. A. A.
Cowley.

HON'BLE MR. F. A. A. COWLEY, *Secretary and Chief Engineer, Public Works Department, Bengal.*

WRITTEN EVIDENCE.

Note on the waterways committee.

Mr. Cowley was examined orally on this note prepared by Mr. G. H. W. Davies, I.C.S

Qs. 97-100.—In 1906 a Standing Committee was appointed “periodically to inspect the natural and artificial waterways between Calcutta and East Bengal and to suggest measures of improvement.”

The Committee consisted of three official and one non-official member (nominated by steamer company). Its scope was limited to the channels from Calcutta as far east as Barisal and Madaripore.

The Committee was to suggest to Government measures of construction and maintenance for giving greater facilities to traffic and measures to control and regulate traffic.

In 1911 the following additions were made to the Committee:—

- (1) Representative nominated by Bengal Chamber of Commerce.
- (2) Representative of East Bengal Commerce.
- (3) East Bengal Official (Chief Engineer).
- (4) Vice-Chairman of Port Commissioners.

The object of the change was to give fuller representation to commerce and to change the body from a departmental committee constituted for inspection purposes and for the determination of professional questions into a general advisory body which could be consulted by Government on all questions connected with the utilisation and the improvement of the waterways of the two provinces.

In February, 1912 the Committee recommended to Government the formation of a permanent “Waterways Department.” Proposals were made in the Press about the same time for the formation of a “Waterways Trust.”

Pending decision on these questions, Government decided to enlarge the Standing Waterways Committee, which was to be composed of—

PRESIDENT:

Member of Executive Council in charge of Public Works Department portfolio.

MEMBERS :

Chief Engineer to Government of Bengal.

An official member to be nominated by Government to advise on financial matters.

The Superintending Engineer, South-Western Circle.

A representative of railway interests to be nominated by Government.

Vice-Chairman, Port Commissioners, Calcutta.

A member to be nominated by Calcutta Chamber of Commerce.

A member to be nominated by Bengal National Chamber of Commerce.

A member to be nominated by Narainganj Chamber of Commerce.

A member to be nominated by two steamer companies.

Bihar and Orissa and Assam were to be asked to depute their Chief Engineers to advise on matters in which they were concerned.

Subsequently a special sub-committee was appointed to examine the probable costs of maintenance and revenues of waterways with a view to the formation of a Trust.

After several discussions this special sub-committee decided in March 1914 that the formation of a waterways trust was not possible until the new Grand Trunk Canal had been sanctioned and funds provided for its construction.

The local Government favour the establishment of a waterways trust, but consider that it should not be created until it is justified by the financial position of the Grand Trunk Canal.

The chambers of commerce, on the other hand, desire that the trust should be created at once and that it should carry out the construction of the canal.

Meantime the Standing Waterways Committee continues as an advisory body to Government. It considers new projects and schemes, opening new waterways, maintenance of existing waterways, levy of tolls, dredging operations, etc. Since the war its operations have been curtailed by lack of funds.

It may be asserted that with a committee thus constituted commerce and trade is not likely to suffer through neglect of the waterways of Bengal.

ORAL EVIDENCE, 10TH JANUARY 1917.

President.—Q. You know the question from the point of view of Government, and we should like to know whether there is anything that we can do, whether it is necessary, in fact, for us to take the matter in any way beyond what has been taken up by your Government. We have had what I suppose it is your note?—A. I fancy that has been prepared by Mr. Davies.

Q. It seems to be a historical sketch of what has taken place. It says, "In February 1912, the Committee recommended to Government the formation of a permanent Waterways Department. Pending decision on these questions, Government decided to enlarge the Standing Waterways Committee." Which Government?—A. The Bengal Government.

Q. But I understand that the Trust proposed was intended to operate over Eastern Bengal and Assam and in the west over Bihar and Orissa and even to the United Provinces?—A. The Trust proposed was to control the waterways of both the provinces. It would not go very far into the United Provinces but up to the limit of steam navigation on the Ganges, that is, I believe about the boundary of Bengal and the United Provinces.

Q. There will be a good many difficulties about bank rights of way, that is, riparian rights in passing through these different districts?—A. Yes. I believe I am correct in stating that accretions belong to the zamindar who owns the land alongside.

Q. Would that require legislation?—A. Yes. But I presume that the Trust if it was interested in navigation would not permit of accretions where it was necessary to stop them.

Q. But it will have to get power by legislation?—A. I do not think so.

Q. Had this question been before the Government of India?—A. No. We had a sub-committee and I was President of that sub-committee. A unanimous report to Government was submitted by us in which we stated that it was impossible for a Trust to be formed until such time as the Trust had some assets. The assets we proposed were, of course, the Grand Trunk Canal. When that had been completed the formation of a Trust could be more reasonably thought out. At the present time the formation of a Trust is impossible because there are no assets.

Q. The Chambers of Commerce are in favour of forming the Trust at once?—A. The proposal would simply mean that this Local Government and the Imperial Government and every other Local Government concerned would have to subscribe very largely, in fact, nearly the whole cost.

Q. Is there anything against it on the score of principle? You and your sub-committee think that it is desirable?—A. Undoubtedly, I think. Of course, my ideas on the question of the Trust may not be quite in accordance with the ideas of the chambers of commerce or

the representatives of the steamer companies. I do not see how the Trust is to be formed without the Government having a paramount interest for some period of years.

Sir F. H. Stewart.—*Q.* Who were on the sub-committee?—*A.* The report of the sub-committee was signed by myself, Mr. Pointon as representing the steamer companies, Mr. Gerard nominated by the Bengal Chamber of Commerce and Mr. Hilary.

President.—*Q.* Where does the Waterways Committee get its funds from?—*A.* It has no funds. It is a purely advisory committee.

Q. The note says, "Since the war, its operations have been curtailed by lack of funds"?—*A.* That is, of course, to a certain extent true in this respect, that for the improvement of waterways we have, since this Standing Waterways Committee was formed, submitted to the Government of India certain proposals for the purchase of a dredging plant. The Government of India have sanctioned certain estimates and we have purchased one dredger at a cost of four or five lakhs, I forget the exact figure now and several other things in the shape of barges, steam tugs and that sort of thing. That has now in part gone to Mesopotamia.

Q. You are still of opinion, in spite of what the chambers of commerce say, that it is impossible to form a Waterways Trust?—*A.* I do not say that it is impossible to form it. I say that it is impossible to form a Waterways Trust on the lines of the Port Trust, because you have nothing in the way of funds.

Q. The Government could guarantee a loan for the purpose surely? There must be no difficulty about that? The Government need not provide money but may guarantee interest on loans raised for the purpose?—*A.* Yes. That would be one way of solving the difficulty.

Q. I am asking you this question because if the financial objection is the only objection?—*A.* I do not think it is the only objection.

Q. Have you any others?—*A.* Yes. Several. Out of India you won't find engineers with the necessary experience for this particular class of work. You have, first of all, got to get your men here and train them to the conditions which exist. There are a few engineers in this country outside the Public Works Department who have any experience in this, so far as I am aware—I may be wrong.

Q. The conditions that we have to deal with in the Sunderbans are most peculiar, and therefore if the whole of the Waterways Engineering Department is to be recruited from the Public Works Department, I fail to see how the Government should not have a large interest in the matter.

Q. I suppose Government would have a large interest in it in any case?—*A.* Yes, as an Imperial asset.

Q. I do not know if I am correct; I do not look upon the Port Trust or any of these things as anything in the way of private enterprise, but as a matter of Government handing over for administration a sum of money or guaranteed funds. The Trust is formed so that all the interests concerned should be properly represented and that the objects of the Trust should be worked in the interests of local people. It is a way really of forming a small local Government. The difficulty then in your way is the difficulty of getting engineers?—*A.* In the first instance, it will be very hard to get engineers with the necessary knowledge of local conditions to carry out what the Trust would require them to carry out. There is, no doubt, a very large body of practical men who have received their training in the service of the inland steamer companies who have a great deal of practical knowledge of what goes on in the way of silting, etc., and they are now of considerable use to us in the department in maintaining the routes. But their knowledge is not highly skilled knowledge and they have more practical experience in the way of overcoming small difficulties than anything else.

Q. I suppose the class of engineer you will get will be men like the engineers experienced on the Mississippi?—*A.* I do not know of the exact conditions of the Mississippi, but men who have had experience there would do equally well here.

Q. Do you think there will be any difficulty of men in that kind being obtainable, and if they are not obtainable could we not get one or two men and make a start and train others?—*A.* I do not say that it is impossible. I say that it will take years and I say that in the first instance you must have funds.

Q. If the Government financed the Trust and then handed over the administration of the Trust to a body, that body could set to work in the way the Port Commissioners do?—

A. Yes. I do not mean to say that the thing is impossible. In my opinion, if you form a Trust to carry out the scheme for the improvement of these waterways, you must, I think, in the original instance, rely upon Government to do the work and provide funds. I think it will be unfair to the Public Works Department to have this scheme carried out by the Trust.

Q. I do not quite follow that point why it should be unfair to Public Works Department officers. Somebody who is efficient should do the work and if they are Public Works officers so much the better, but in the absence of officers experienced in this class of work there would be no harm in importing an outside engineer and placing him under the orders of the Trust?—*A.* None whatever. I do not object to that at all.

Q. I think the main point for us to consider, first of all, is whether this development of waterways will be in the interests of commercial and industrial development?—*A.* Yes.

Q. If that is admitted, and I take it for granted from the recommendation of your sub-committee, then the question of ways and means arises. The first one is that of finance. You think there is no difficulty in Government guaranteeing a sum of money raised from the public and placing it at the disposal of a properly constituted Trust?—A. I see no objection to it myself.

Q. That gets over the financial difficulty so far as we can judge? Next follows the question whether you can get engineers to undertake the work, and I understand you to say that at present you could not put your hand on men who have the right kind of experience in the Public Works Department, but do you object to introducing river experts from outside?—A. I do not think I said that. We have men in the Public Works Department with sufficient experience at the present time.

Q. You have?—A. Some. I see no objection to getting men from outside with similar experience.

Q. But if you have experienced officers in the Public Works Department, so much the better?—A. I say that we have at the present time a certain number of Public Works Department officers with the necessary experience to start work, not on a very large scale but on a small scale.

Q. Then the question of engineers presents no difficulty? You have men?—A. The difficulty that I was suggesting was not that there were no engineers available, but you would have to indent on the Public Works Department in the original instance for starting work. That is the point.

Q. There is no difficulty in that, I suppose?—A. I suppose there is no difficulty in that.

Q. The Public Works Department officers will be as glad to work for this Trust as to work in any other capacity for the Government?—A. Yes.

Q. Are those difficulties removed so far as we can judge this morning—the financial question and the question of engineers?—A. Yes; the difficulties are, in my opinion, removed if you can obtain the necessary financial assistance and the engineers with the necessary qualifications to carry on the work.

Q. I understand you to say that these engineers do exist to begin with?—A. Yes. Some exist, of course, I dare say, in Burma and elsewhere where similar conditions exist.

Q. Are there any other difficulties that we ought to take into account before making any recommendation on this point?—A. None whatever. The only difficulty which the committee of which I was the President pointed out was that if the Trust was formed it would have no assets.

Q. Are you of opinion that we should be justified in urging this on Government as a matter of public importance when finances permit?—A. I think to a certain extent it is of very great importance. In my opinion we must have the Grand Trunk Canal. This is purely my own personal opinion. Otherwise inland steamer companies in time will be up against a very big problem.

Q. Whatever you form, a Waterways Department, or a Waterways Trust, or a Standing Waterways Committee, its first work would be the construction of the Grand Trunk Canal?—A. Yes.

Q. It seems to me that the difficulties are not great so far as they are visible?—A. The difficulties are not great if the money is forthcoming.

Mr. C. E. Low.—Q. Was there any idea of getting any more funds from any of the interests concerned, not only from the Governments but from the interests concerned?—A. Yes. The whole thing was threshed out. May I quote from my note on the formation of a Waterways Trust, dated the 6th April 1916. The proposals were that the Trust should take over and maintain and manage groups 1 and 2, we group the waterways into groups, and receive therefrom all tolls and revenue derivable paying to the Government of India an annual sum of Rs. 90,000 for the canals included in group 2. A further subsidy shall be paid by the Imperial and the Provincial Government for the maintenance of all the rivers included in group 3. Mr. Pointon's proposal was that the Government of India should pay a subsidy of six lakhs of rupees per annum, the Government of Bengal a similar sum and the Governments of Bihar and Assam should pay a subsidy of one lakh. The District Boards should pay subsidies for work done.

Q. That is supposed to be enough to cover the estimates of expenditure?—A. No.

Hon'ble Pandit M. M. Malaviya.—Q. What would be the total receipts so estimated?—A. 15 lakhs is the total of the subsidies. Subsidies to the extent of 14 lakhs would be required to carry out the programme of work annually. That is the general calculation.

Mr. C. E. Low.—Q. The class of receipts was from the Imperial and Provincial Governments and the District Boards?—A. Yes.

Q. And also the tolls leviable were to be made over to the fund?—A. Yes.

Q. It does not seem to me on that showing that the steamer companies concerned were to contribute one iota to the funds for the greatly increased facilities which they would presumably enjoy? Is that correct? Was there any reason for it, such as inability to pay or difficulty of collection?—A. At the present time the steamer companies pay Rs. 5 per trip through the Sunderbans and an additional toll passing through the Madaripore bhal. The

Government gets that amount at present. The Madaripore bhal route is worked in itself and the amount of toll is credited to that particular work. We keep a capital and revenue account for it. As regards your question about tolls, I am afraid I cannot give you a very clear answer. The idea was that the tolls should be given over to the Trust and with regard to the existing locked canals the Government of Bengal was to receive Rs. 90,000 annually from those tolls on account of their outlay in construction. In the Madaripore bhal route tolls are now paid and Mr. Pointon's note says that it is not necessary to raise the toll. As regards the use of the other channels I presume that the same rate of tolls as at present exists would not continue but would have to be increased.

Q. You see my point. The body is constituted for the purpose of improving the facilities which those interests enjoy?—A. Yes.

Q. You are making them pay a substantial increase for a specific work, namely, the Grand Trunk Canal, but it is not clear whether you make them pay any more for the improved facilities which they will enjoy on the rest of the system?—A. The question of the increase of tolls is not one which should be lost sight of at all.

Q. Turning to the question of the Grand Trunk Canal Project, you speak of it as an asset?—A. Yes.

Q. It is, of course, also a liability? Is it clear that it would pay?—A. It gives you 8 per cent. This estimate is very complete and very reliable. The former estimate which was made was, in some respects, deficient, as various difficulties were not thought of. This estimate prepared by Mr. Addams-Williams is a complete and accurate forecast of what, I believe, is going to happen if the Grand Trunk Canal is constructed.

Q. With reference to estimates on productive works generally, there is a certain amount of experience and you could fix some figure of interest which they would pay. Has there been experience of works of this kind?—A. Yes. We have the Madaripore bhal route at the present moment.

Q. Have they been constructed?—A. That has been constructed. The estimates in that case were largely under-estimated, but with the works which we have recently carried out, I think that eventually we will get 4 or 5 per cent. out of the Madaripore bhal route as a permanency.

Q. An under-estimate in one case is, of course, a valuable guide to future probabilities in others?—A. Yes. The under-estimate of Madaripore bhal route was very largely due to the fact that it was not thought that it would fulfil its purpose to such a large extent as it does now. The conditions have changed and we have to contend with varying conditions and we have had to extend our works to prevent silt deposit and that sort of thing with the result that at the present moment this year we have a very large excess of toll over that of any previous year.

Q. Is there any other instance besides the Madaripore bhal bearing on the point?—A. We have many instances—the navigation canals of Midnapur, the Orissa coast canal. These are all losing concerns. The navigation has been very largely stopped by the railways. The loss is due to the increase of railways in the immediate neighbourhood.

Q. You have reason to think that you have got a sufficient basis?—A. Yes.

Sir F. H. Stewart.—Q. Your Standing Waterways Committee is a purely advisory committee?—A. Yes.

Q. Who is the executive officer of it?—A. For instance, at the last meeting a Member of the Executive Council, Bengal, the Hon'ble Mr. Beatson Bell, was the President and there were ten ordinary members with the Secretary.

Q. Executive action is taken through the Public Works Department?—Yes.

Q. How often does this Standing Committee meet?—A. Whenever necessary. For instance, we should have a Standing Committee meeting to consider this report immediately after it has been issued to the public bodies.

President.—Q. Have you got any further remarks to make?—A. I should like you to consider that paragraph in Mr. Addams-Williams' report which refers to the necessity of putting through this work. You will see there that he shows very clearly that unless a canal of this kind is shortly constructed the steamer routes of the Eastern Bengal will be, to a certain extent, put to a very considerable extra expense and trouble. The difficulty is that you have to move from west to east to get to Eastern Bengal and east and west channels present a difficult problem. The north and south channels maintain themselves to a very great extent and the difficulty is the maintenance of these east and west channels. The Sunderbans area is now to a certain extent in parts reclaimed and the east and west channels are drying and difficulties will increase, so that a canal of this description which will avoid the worst part of the Sunderbans is eminently desirable, and in the interests of the steamer services and trade with the Eastern Bengal by river, very necessary.

Q. We ought to urge it with or without the bigger question of forming a Waterways Trust?—A. Yes.

(Witness subsequently forwarded the following supplementary written evidence.)

On reading the evidence through I believe the impression might arise that I am of opinion that it would be possible to ask Government to guarantee interest on loans raised for

the purpose of a Waterways Trust. I have said in my evidence that this would be one way of solving the financial difficulty but as I have more than once stated in my evidence, the difficulty is that a Trust if formed at once on the lines of the Calcutta Port Trust would have no assets, and I am of opinion that the time has not arrived when such a proposition could be laid before the Government of India with any chance of success. I shall be glad if this opinion be recorded.

WITNESS No. 177.

Mr. J. C. K.
Peterson.

MR. J. C. K. PETERSON, I.C.S., *First Land Acquisition Officer, Bengal.*

WRITTEN EVIDENCE.

Account of the Trade in raw hides in Calcutta.

The trade in raw hides before the war, so far as Calcutta was concerned, was almost entirely in the hands of German firms or firms the controlling interest of which was largely German. These firms formed a combine of shippers and worked in connection with a similar combine of buyers at Hamburg, to which port the great majority of the hides were exported. On two occasions at least two firms endeavoured to break through this combine; both attempts were entirely unsuccessful. Various suggestions have been made as to the causes of this combine which undoubtedly existed. It has been suggested that the shippers and buyers were backed by the German Government who desired for military reasons to get the control of the trade into their hands. Personally I do not believe that this was the origin of the combine, though I think the German Government made use of it during the period immediately before the war to retain the control of the supplies of leather required for military purposes. But in its origin the combine was economic rather than political. The hide trade has always been looked down on. It is not a particularly savoury business. It has had in the past a bad reputation. There is often much dishonesty in the method of curing the hides in the mofussil, the fleshers and skinners often adding earth and other substances to the salt used for curing, or skinning the hides badly in order to increase the weight. There have also been many complaints of a grave nature brought against the collectors of the hides in the districts. I may refer to the agitation as to the practice of skinning goats alive in order to procure larger skins and to the outbreak of cattle-poisoning that occurred some years ago in Bihar. For these reasons the ordinary English firms in this country would not touch the trade, and it was consequently left for any persons who wished to take it up. After the Franco-German war there was a very great development of the tanning industry in Germany and Austria and to a large extent the tanners in those countries deprived the English tanners of this business. In order to meet their demands for raw materials, the purchases of the raw hides on behalf of Germany and Austria increased very largely, until shortly before the war these countries were taking 60 to 70 per cent. of the total hides exported from Calcutta. These hides were shipped direct to Hamburg and Trieste which ports were the principal buyers. This fact alone sufficiently explains the German control of the trade. It is obvious that if Germany and her allies purchase seven-tenths of the total produce, they will make their own arrangement for the selection and shipment of the goods purchased. The trade fell naturally into German hands. The firms who had taken it up found it extremely profitable, and as in any other business, when they found that new firms, attracted by the profits, were endeavouring to enter the business, they naturally proceeded to freeze them out. This was the chief reason for the combine. At the same time the trade is obviously of great military value, and I do not think there is much doubt that the German Government were aware of this in the years immediately preceding the war and that they encouraged it.

The following is a brief account of the organization of the trade.

Raw hides, after being dried or salted in the mofussil, are despatched in the first instance by the collectors to the arathdars or commission agents in Calcutta. These hides come from all over the North-Western Provinces, Bihar and Orissa, and Eastern Bengal and Assam. The hides coming from the west are usually dried hides, those from the east are usually salted hides. The arathdars deal with all classes and descriptions of collectors. Their biggest customers are the big butchers of Cawnpore, Lucknow, Patna, and such towns; parcels of hides despatched to them may vary from 10,000 to 100 hides. But the arathdar is merely a commission agent. He receives the hides, stores them in his godown and sells them to the shippers. He does not actually purchase the hides himself and they do not at any time become his own property.

His commission is realized when the hides are sold and is generally fixed at so much per 100 pieces. The commission does not depend on the price obtained. The arathdar's success will, however, depend on his obtaining good prices. At the same time the arathdar is largely responsible for financing the collectors. According to the custom of the trade, he advances 75 per cent. of the value of the hides despatched to him on receipt of the railway receipt; and, when competition is keen, he may even advance as much as 100 per cent. He gets no interest on these advances. When despatching the hides the collector fixes a minimum price below which the arathdar may not sell without his consent. On receiving the hides the arathdar selects and classifies them and then informs the shippers that he has a parcel of such and such hides for sale. The arathdar's selection is of no practical import-

ance and is merely used for his own information in deciding what price the parcel of hides should fetch, the real classification of the hides for the purpose of export being made by the shippers.

The shippers visit the arathdar's godown, examine and select the parcels of hides offered for sale, and according to their own selection offer a certain price for them "all-round." The arathdar takes the best price obtainable and this concludes his part in the business, the shippers being entirely responsible for the removal of the hides. By the custom of the trade cow hides are sold by the "pound," the "pound" being equal to 20 pounds (Avoirdupois). They are also sold "all-round." This means that the buyer must accept a parcel containing a certain proportion of all classes and that he is not entitled to include the better classes and to reject the worse. The reason for this is that unless the hides are lumped together in this way, it would be impossible to find a market for the worse classes of hides at all and these would be unsaleable. The success of the German firms was largely due to the fact that they were willing to purchase "all-round," whereas Ispahani and Sons and other firms only desired to purchase the better qualities. An "all-round" parcel of hides might, for instance, contain the following qualities :—

80 per cent. slaughtered.	4 per cent. rejected.
12 ditto dead.	4 ditto double rejected.

After the sale the shipper removes the hides to his own godown. They are here first trimmed, that is to say, the claws, earth, etc., are removed, and are then arsenicated in order to preserve them. The cost of this is infinitesimal. The hides are immersed for 24 hours in a weak solution of arsenic and then spread out to dry in the sun. This process is not necessary in the case of salted hides. After this the shipper makes his selection and classifies the hides for export.

A great deal has been made of this classification. In the correspondence sent to me it is represented as being extremely intricate and difficult and requiring great experience. And it is also said that it is extremely difficult to understand the marks. It is really, however, a very simple matter. By the custom of the trade hides are divided into the following classes :—

1. *Agras*—Well cleaned hides of a good yellow colour.
2. *Purneas*—Darker and not so well cleaned.
3. *Darbhangas*—Fairly cleaned.
4. *Patnas*—Badly cleaned hides with flesh and sinews adhering.
5. *Bazar*—Very badly cleaned and rotten in places.

This classification refers to dried hides only. The names used do not necessarily mean that the hides in question come from these places. They are merely used as trade names to describe a particular class of hides and might as well be replaced by Nos. 1, 2, 3, etc. They only denote quality.

Salted hides are similarly classed as *Dacca*, *Meherpur*, etc. A similar classification according to districts is used in Madras and I believe in Bombay also. But the selector in classifying the hides makes no enquiries as to the place of origin and simply assigns each hide to each class according to its condition when he sees it. Most of the best dried hides do, of course, come from *Agra* and the neighbourhood. But if a hide of this quality was produced and cured in Calcutta or anywhere else, it would still be classed as *Agra*.

These classes are again subdivided into the following qualities by the selectors :—

- (1) Commissariat.
- (2) Slaughtered.
- (3) Dead.
- (4) Rejected.
- (5) Double rejected.

Here again these terms merely denote quality and there is nothing really abstruse about the classification. The selector makes no enquiry as to whether the hide that he is classifying actually comes from slaughtered cattle or not. He judges solely by the appearance.

- (1) *Commissariat* hides are the best possible hides in their class. They are not very common and practically only occur in *Agras*. The name was obviously given because the best hides come from Commissariat slaughter houses.
- (2) *Slaughtered*.—These are average first class hides without defect or blemish.
- (3) *Dead*.—These are the same hides with one defect, such as a cut or a brand mark.
- (4) *Rejected*.—These are hides badly cut or marked or branded.
- (5) *Double rejected*.—These are the worst class of hides, rotten in places and very badly marked or branded.

The classification having been made, the hides are again divided into heavy, middle and light in each quality of each class.

As I have said, there is nothing really abstruse about this classification, and as a matter of fact all the shipping firms, including the German firms, rely entirely upon their

Indian establishment for the classification and selection of the hides. It would be quite impossible for the shipper to select the hides himself, although he may occasionally check the selection. The hides are always selected by two independent establishments; once in the arathdar's godown when they are purchased and again in the shipper's godown for export. One selection is checked by the other and it seldom happens that there is much difference between the two. The selectors are usually Muhammadans who have been brought up to the trade and they are paid on an average Rs. 50 a month.

The shippers inform me that the tanners in England and elsewhere are perfectly aware of the meaning of their marks, and that no tanner would make a mistake as to the meaning of an "Agra heavy slaughtered" or a "Purnea light rejected." Most of the double and treble rejected were before the war sent to the Levant. There is at present no very good market for these classes. The shipper's classification of the hides is tested as in any other business by the amount of satisfaction which he gives to his buyers. It is very important to him that he should maintain a definite standard, as if his buyer is dissatisfied with one consignment and considers that it contains too many classified as say, "slaughtered," i.e., first class which should have been classified as "dead," i.e., second class, he would go elsewhere for his next consignment. The classification therefore adjusts itself.

Suggested measures for removing the German control.

The first question is what measures should be taken for destroying the German control of this trade. It is, in my opinion, impossible to do this unless either England or India is prepared to take the hides and tan them before export. So long as Germany and Austria continue to take three-fourths of the total exports, it is obvious that they must ultimately control the market. And it would be a mere waste of time to endeavour to devise measures to prevent this. I do not think it could be done. Any prohibitory legislation would principally affect the dealers in the raw material, with whom we are chiefly concerned in India, and could not have the effect of removing the control naturally exercised by so large a purchaser. It must be remembered that the German firms used to pay very good prices for the hides. This was one of the chief reasons for their control of the market.

The only practical suggestions that have been made as to the means to be adopted to prevent their recovering this control are :—

- (i) The appointment of an agent in this country by the English buyers.

The idea, as I understand it, is that an agent should be sent from England. Several of the larger agency houses in this country made an attempt in past years to enter this business. They found however that great loss and delay was caused by disputes as to the quality of the hides shipped by them on their receipt in England. This difficulty might be overcome if the English buyers would consent to send out an agent to this country who should be responsible for the quality and selection of the hides shipped, the agency houses in India being responsible for financing the business only and not for the quality of the goods supplied. If any demand in India arises for these hides, such an arrangement might be made. I may point out however that English and other tanners are already perfectly conversant with the marks used by the shippers in Calcutta. They know exactly what they are buying, for instance when they buy a "Heavy Agra Slaughtered." Apart from this the English tanners apparently do not want these raw hides. Even if after the war the demand increases, I doubt if there would be any great advantage in appointing the proposed agent. The idea is that he should select these hides for his principals, and that he would deal with the Indian firms, by which, I suppose, is meant the arathdars, on the spot, the idea being that English buyers are distrustful of Indian firms. The proposal seems to ignore the fact that it is not usually the arathdars who make the selection for export, but the shippers. As I have already shown, the hides are at present really selected by the shippers and they are very thoroughly selected. This work is done entirely by Indian establishment. It would be physically impossible for any shipper or agent to select the hides himself. If the proposed agent were appointed, he would, therefore, merely be competing with the shippers and it would take him several years to get together a staff that would enable him to select these hides with any success. He would probably in the end simply buy his consignments from the shippers, relying upon their selection, and would thus introduce a fresh link in a business which is already in my opinion overweighted with middlemen.

- (ii) That the export of raw hides in other than British ships should be prohibited.

The second proposal would entail special legislation, and, as I have already pointed out, I do not think that it would have any real effect in removing the German control. If assistance of this nature is to be given by Government, the aim should be to protect the tanning industry in this country and not the interest of the selectors or shippers. Protection of the latter would benefit a small class, and would probably injure the class which at present deals in hides. Protection of the former might build up a very important industry. The real solution of the question is to be found in the development of an indigenous tanning industry which will convert these hides into either half-finished or finished leather before they leave the country.

Possibility of creating a tanning industry in Bengal.

There are already several tanneries in Bengal, three or four in Calcutta, one at Berhampore and, I believe, one or two at Dacca. The tannery at Berhampore has been

recently established. There is also a certain amount of tanning done in the villages, but not on any large scale. I do not think it is possible to draw any inference from the success or failure of such tanneries. They are small enterprises, and although their experience is of great value on technical points, they are not working on a sufficiently large commercial scale to affect the issues raised. Before the war they were, I believe, in a somewhat precarious condition financially. They are now making a fair profit—at least those which I have seen are making a fair profit—but this is largely due to war conditions. The success of these small tanneries has, however, shown that the climate of Bengal in general and of Calcutta in particular is not unsuitable to the tanning of leather. The conclusion I have arrived at, therefore, is that there is no reason why a very important industry in tanning should not be developed and that the most suitable place for this would be Calcutta.

If tanning on a large scale is to be a commercial success, the following conditions must exist:—

- (1) There must be a large and constant supply of the raw material and experts must be available to make the necessary purchases of the raw material for the factories. The jute trade is a case in point. Here Calcutta has an obvious advantage over any town or place in India. The factories would be at the centre of one of the biggest hide markets in the world and would be able to purchase the raw material at the cheapest rates. There is already in existence a very large and well financed organisation which is constantly collecting these hides and pouring them into the arathdars' godowns in the town. There is also a large organisation occupied in selecting, classifying and purchasing these hides for shipment. The shippers would naturally select and buy for the factories if these came into existence, in the same way as jute brokers buy jute and sell it to the mills. It would make no difference to their business if the hides were tanned or half-tanned before shipment.

If the industry is to be successful on a really large scale, it is essential that the material used should be the dried and salted hides at present exported from Calcutta. For this reason the experience of the tanners at present working in Calcutta is not so valuable as it might have been otherwise. These tanners work almost entirely with freshly skinned hides obtained from the municipal slaughter houses.

- (2) There must be a plentiful supply of water which is suitable for tanning. Here also Calcutta has an obvious advantage. So far as I know, no analysis of the water-supply from the tanners' point of view has been made. But the success of Dr. Nilratan Sirkar's tannery, which uses this water, shows that it is suitable and there is a plentiful supply. Another point in favour of Calcutta is that electrical power can be obtained. I do not know if the electrical system of tannage has any future. Experts seem to be rather doubtful about it. But the advantages of an electric supply are in any case obvious.
- (3) There must be good banking facilities. The German firms depended very largely on the banks who used to advance money against the hides as these were brought into their godowns. The Chartered Bank, I believe, did a good deal of this business. Such facilities are even more necessary in the case of tanneries. In tanning a very large amount of capital is always locked up for one to five months in the shape of hides lying in the vats. Here also Calcutta has an obvious advantage.
- (4) A constant supply of suitable tanning materials. For bark tanning a very plentiful supply is already available. The bark chiefly used by the Bengal tanners is babul. In Madras, avaram or tarward bark is much used, especially for the half-tanned hides which are exported in large quantities. But avaram (*cassia auriculata*) possesses no advantages over babul and is probably inferior as a tanning material. There is also a plentiful supply of myrobalams. Personally I do not think that there is much future for bark tanning and very soon most of this will be replaced by chrome tannage or tannage with bark extract. There is already a myrobalam extract factory at Bansra near Raniganj, which exports most of its production. As to the chemicals required for chrome tanning, these are chiefly chrome alum or bichromate of potassium and the aniline dyes required for colouring the leather. Chrome is, I understand, to be obtained near Quetta, in the Central Provinces and in Singhbhum. In any case, however, Calcutta is as favourably situated as any other place in India in this respect.
- (5) There must be a large and constant demand for the manufactured article. There is apparently no very great demand for dressed leather within India. There must, however, be a very large demand outside. The statement attached showing the imports into and exports from the Calcutta trade block shows this very clearly. I may say at once that without protection it would be impossible for the Bengal or Indian tanner for the first few years to compete with foreign countries. In almost every country a prohibitive duty has been placed upon the import of leather and it would be impossible for them to find a market. But apart from this, there can be no doubt that the demand exists.

The world must have leather. The continually increasing exports of the raw hides proves this and the ever spreading search for new sources of supply of the raw material. The demand, and in fact the actual necessity, outside India for the leather manufactured from the hides which we export is, therefore, clear enough. India here is in a very sound position. She controls one of the largest sources of supply of the raw material. I think she is quite able to treat this with materials which can be procured within the country, and if she likes to insist that it should be treated before it leaves the country, the consumers of the actual finished leather will be compelled to take it from her. The world must have the leather in some shape or other. If India insists that the hides shall be tanned in this country and that no raw hides shall be exported except under prohibitive duties, the consumers must take it in the finished shape. They cannot do without it. If in retaliation they put on duties against it, they will be merely fining themselves. But it will probably take them several years to discover this, and unless the industry is protected it would be ruined before it was fairly started.

India is also in a very good position to ask for protection of this nature from England. The English tanners will not take these hides and will not tan them at present. It is extremely likely that after the war protection of some kind will be introduced in England, the Colonies, and India. Any measures of this kind must to some extent harm Indian consumers in respect of the articles protected. India will expect something in return, and if she does not ask for too much, will probably get it. The tanning industry holds out extraordinary prospects of development for the reasons I have given. It is also of the greatest military importance. There is, therefore, a very good chance that England may agree to its protection, even though the effect may be to raise the price of leather in England. India should, therefore, press very strongly for protection in this shape, and if it is obtained a very large industry in tanning will develop. Apart from this, no more effective method of doing away with the German control of the trade could be devised. In a nutshell the position is as follows:—

Raw hides averaging 1,164,000 maunds a year pass through Calcutta in their raw state, to be tanned in some other country. I see no reason why we should not tan or half tan them first before we export them.

Any proposals for Government assistance that I have to make are therefore based on the assumption that the industry will be protected. There are several ways in which assistance might be given.

1. A school of tannery might be established. The object would be to deal practically with the difficulties that might be felt by the tanners. Throughout my enquiry I have found it impossible to obtain any real scientific assistance. I know of no expert tanner in Bengal who could supply this. There are many questions connected with the industry which it is impossible to answer without scientific advice and experiment. The institution would concern itself with such matters as the following:—

- (1) The production and suitability of the various tanning materials and chemicals required.
- (2) The correct proportions of these to give the most profitable result.
- (3) The proper treatment of the hides in the mofussil.
- (4) The advantages of chrome tanning as compared with bark tanning.
- (5) Whether it would be more profitable to Bengal to turn out half-tanned hides as in Madras or to finish the leather in this country.

I am told, for instance, by one tanner that the worse varieties of dried and salted hides cannot be chrome-tanned profitably. Another tells me that this is not correct. I do not think either opinion is based upon actual experience or, if it is, that the experience really affords sufficient data. The experimental tannery or school of tanning which I suggest would deal with such questions by actual experiment. Again, I am told that it is impossible to provide a half-tanned hide such as those required by the War Office at present by babul tanning or by chrome tanning. But another tanner tells me that chrome crust leather has possibly a great future before it, and yet another says that there would be a great demand in England for leather which had been half-tanned with babul bark. This again is a matter for actual experiment.

2. Government might assist in the organisation of new tanneries, either by guaranteeing the interest on the capital raised or by providing a certain amount of this at a low rate of interest, or by agreeing to purchase a definite percentage of the outturn, provided this were up to sample, or by providing land. Here also there is a good opportunity to assist in the development of the industry. Government has much spare land in Calcutta that might be used more profitably than it is used at present.

3. Assistance might also be given by supplying the tanning materials required or by granting specially low rates of freight for these on the various railways by which they are brought into Calcutta. In this direction there is a great deal to be done, one of the principal needs being a cheap and constant supply of the various chemicals wanted for chrome tanning.

4. All these methods might be combined by the creation of an experimental tannery under a qualified expert. I should float this as a company at a return of 5 per cent. I would ensure this return by agreeing to purchase either the whole outturn or a proportion of this at a fixed price provided it were up to sample. I do not think there would be the least difficulty in procuring the capital required from the arathdars, the shippers, the tanners and the various firms interested in the trade. The Government expert would be the manager and there should be a Government director on the board. It should be distinctly understood that the work of the tannery would be chiefly experimental and that one of its principal objects would be the training of labour in the work. All profits in excess of 5 per cent. would be devoted to experiment, the debenture holders being entitled to their 5 per cent. and to no more. The profits would almost certainly exceed that if protection were introduced, and with this example before them other companies would not be long in coming forward. If the outturn was unsatisfactory and the tannery was unsuccessful, I would reserve the right to Government to close it on return of any capital invested in it.

5. I cannot advise as to the experts. But if a sufficient salary is offered, there should be no difficulty about getting one or more. What is wanted is a practical tanner and an expert chemist. A factory that would suit very well for such a purpose could probably be purchased in return for a certain number of shares in the company or for cash. If Government are at all inclined to consider this scheme formal and exact proposals could be worked out after negotiating with the various persons interested.

6. A still better arrangement, but one that is very much more expensive, is connected with the proposals made by the Corporation for the removal of the hide trade from Calcutta itself to the fringe area. The Corporation have resolved that all the arathdars' godowns are to be removed to an area lying to the south of Sealdah station and to the east of the Eastern Bengal State Railway line. This resolution has been suspended during the war, but will be enforced at its close. The present is obviously a very suitable time to move the godowns, as the trade is dull. The scheme that I would suggest is that the arathdars should now be persuaded or forced to remove to a certain definite area in the area set aside by the Corporation, and that the experimental tannery should be set up there. If the railway allow a siding, other factories would come into existence as near the market as possible, and the result would be that the hide and tanning trade would be confined to one part of the town where it would have ample facilities for its business and where it would not annoy the other inhabitants. The great difficulty here is to persuade the arathdars to move. They will not themselves combine except under pressure and their chief objection is that they cannot obtain the land. I am assured that there is any quantity of land, but, as I have said, they will not combine. If land were placed at their disposal, I think they could be compelled to move. The Corporation and the Improvement Trust, however, both take the view that it is not within their proper functions to provide land for such a purpose. Here they are probably right, and I doubt if Government would have any power to acquire for such a purpose or to spend public money on it, even if the arathdars formed a company for the purchase of such land as they need. But if Government offered to put down an experimental tannery as a nucleus and they understood that the supplies of raw material required by the tannery would be taken from their stocks, I have no doubt that they would sooner or later group their godowns round it. If such a scheme were ultimately contemplated it would probably be possible to lease a factory until the new buildings were ready.

Imports into and exports from Calcutta trade block of hides (raw and dressed or tanned) carried by rail, road, country boats, inland steamers and sea (coasting and foreign) during the four years ending 1915-16.

YEARS.	IMPORTS.		EXPORTS.	
	Hides (raw).	Hides (dressed or tanned).	Hides (raw).	Hides (dressed or tanned).
	Mds.	Mds.	Mds.	Mds.
1912-13	1,335,895	5,749	1,446,619	5,606
1913-14	1,273,034	8,356	1,302,490	13,153
1914-15	924,194	3,756	873,947	650
1915-16	1,126,418	5,116	1,075,514	769

ORAL EVIDENCE, 10TH JANUARY 1917.

Mr. C. E. Low.—Q. You say that in Madras avaram bark is much used and that the supply of this bark comes mainly from the Central Provinces. Is that *cassia auriculata*?—

A. I should like to correct that statement. I have been trying to get avaram bark in Calcutta and I cannot do so except at prohibitive prices.

Q. With reference to the export tax on hides the tanning facilities that might be provided would cover only a very small proportion of the available supply and in that case you would be hitting the trade rather too much?—A. The way in which I understood it is this. I think that if you are going to make a success of tanning it would require a great deal of capital. I do not think there is any chance of procuring this unless you guarantee a monopoly.

Q. You have not heard of any firms in Calcutta who are proposing to start any new arrangements of this sort?—A. No firms of any size have taken up the matter. I have papers here from one firm. They did try to start but they gave it up as a failure.

Q. I have personally had confidential opinions from one or two very important firms who are considering the matter?—A. If it will be possible to establish a tanning industry without putting on any tax or any kind of prohibition so much the better, but I do not think it could be done.

Q. Don't you think that in the case of the imposition of a tax the trade would be hit and be disorganised?—A. I think it would unless you arrange that the tannery should start work simultaneously with the putting on of the tax. You must find some outlet for the raw hides in the godowns.

Q. If they could make arrangements to tan a considerable percentage of the hides by, say, three or four years from now, you would with effect from that date put on an export tax?—A. That will meet my point.

Q. It is difficult for Government to promise any such thing because policies change?—A. The whole thing is extremely difficult.

Q. What would you do with the money that you get from this tax. Have you any idea of ear-marking it for any particular purpose?—A. I would use it for a technical institute or for anything else that might be useful to the tanning industry.

Q. If you put on a comparatively light tax on export trade you could then use it as a very effective subsidy for the tanning industry. Have you considered that position?—A. That could be done. But the same difficulty would arise as existed before the war. Several firms did try tanning on a small scale before the war. They found that the German firms were prepared to pay a higher prize for the untanned hides than they could get for their tanned hides. It seems extraordinary on the face of it but I am assured that that was so.

Q. That state of affairs did not exist in Madras where there has been extensive half-tanning?—A. It is the finished leather that I am talking about.

Q. What you apprehend is that either the exporters of hides would close the market against the tanners and put up prices to an extent which would be prohibitive or that they would arrange to get leather imported and undersell them in this country?—A. If we start tanning in this country we will have to depend on the same market for the sale of our leather as Germany and Austria depended on before the war, and if the Germans are willing to pay more for the raw hide and can sell the leather cheaper than we can they will capture the markets and we shall lose them.

Q. But surely if you have the proper tanning processes and the hides and the tanning materials and organisation you should be able to knock out any proposition for the exporting of untanned hides?—A. I think for the first three or four years it would require a certain amount of assistance before it was started and organised.

Q. It comes to this then that you want to start with an organisation which is either organically very strong or which is strengthened by some help from Government?—A. I think it should be strengthened by Government.

Q. Do you mean that Government should strengthen it very materially by guaranteeing purchase?—A. I think that as a matter of fact that is the best method but I doubt whether Government would be willing to do it. It would mean taking a very large quantity. I never contemplated that Government would regard such a proposal at all favourably. I thought they would have very much more objection to this than to an export tax. It would amount to two or three millions a year if it is to be of any value. Government will have to buy and resell. They could not use it themselves.

Q. Is that the lowest figure of output?—A. The raw hides and skins passing through Calcutta before the war were valued at five to six millions sterling. I suppose the value would increase very much more when the hides are finished and dressed. I suppose it would be very nearly doubled. At least 25 per cent. of it would have to be taken over if you are to afford the trade any encouragement.

Q. If Government purchased a fair proportion of the output, say between one and two millions sterling it would put the tanners in an impregnable position?—A. Personally I think it would be easy to work out a scheme on those lines but I think that Government would object to it more than to proposals for a tax.

Hon'ble Pandit M. M. Malaviya.—Q. You refer in your note to the agitation against the practice of skinning goats alive. Has that been put an end to?—A. There was as a matter of fact considerable agitation some 13 years ago. I am speaking from memory. I think it has been put a stop to. I cannot really say. I dare say that it still exists in some parts of the country.

Q. You say that without protection it would be impossible for the Bengal or the Indian tanner for the first few years to compete with foreign countries. Don't you think that with all the facilities in India you should be able to find a market locally for the manufactured goods and that you should be able to do without protection?—A. I do not think there is a very large home demand in India at present.

Q. Is not much of the hides which is exported brought back to the country in a manufactured condition?—A. I do not think there is a great demand for the dressed leather in India. I think a big demand will develop. I do not think that any very great demand exists at present. It is developing now in Calcutta in the case of small tanneries.

Q. As the demand develops the industry will be able to hold its own?—A. If it is assisted in the first few years of its creation.

Q. You say in your note that Government might assist in the organisation of new tanneries either by guaranteeing the interest on the capital raised or by providing a certain amount of this at a low rate of interest or by agreeing to purchase a definite percentage of the outturn. Why do you think this necessary if the trade is a very profitable one? Why do you think that Government help is needed?—A. I do not think it would attract capital. I would not put my own money into it.

Q. For fear that the industry would suffer through foreign competition?—A. Yes.

Q. If that fear were removed then you think that without any Government assistance private capital would be coming forward?—A. I doubt whether private companies will attract capital unless they had some promise of assistance. I doubt very much whether they will come forward.

Q. You think that unless there is an export duty or some other kind of help from Government this industry is not likely to develop to any extent?—A. I think it will develop. It will develop much more quickly if assistance is given. Ordinarily it might take 50 years to develop, but with aid and encouragement from Government you might build up a very large tanning industry in 10 or 15 years.

Q. Do you suggest that Government should guarantee the purchase of the products of the tanneries?—A. I think that is a much more satisfactory way of assisting an industry than guaranteeing interest.

Q. The Government at present patronise Cooper, Allen & Co. at Cawnpore. Do you think that in addition to that Government should purchase a certain quantity from other tanneries?—A. I am looking at it merely from the point of view of Government assisting the industry. They would have to resell it after having bought it. If you guarantee them 5 per cent. on their capital they have no incentive to turn out good stuff. They know that their 5 per cent. is safe. In that case the profits do not depend on their work.

Q. Even if the Government did not require the products for their own purposes they should purchase and resell?—A. I suggest that as a means of encouraging the tanning industry.

Q. Have you any instance in mind in which such a thing has been done?—A. I cannot say that I know of any.

Q. Do you suggest that they should purchase in addition to guaranteeing the interest?—A. No. I only said 'instead of'.

Q. You say that all the methods might be combined by the creation of an experimental tannery under a qualified expert and that you would float this as a company at a return of 5 per cent. and that you would increase the return by agreeing to purchase either the whole outturn or a proportion of this at a fixed price?—A. That is a mistake in the note as printed. The word should be "ensure" not "increase". The idea is that this should be more a technical school than a private company.

President.—Q. One of the chief objections is that we are not justified in recommending Government help except in an absolutely new and pioneer industry?—A. I regard this as such.

Hon'ble Pandit M. M. Malaviya.—Q. You cannot say that this is a new industry. It is only a question of capital coming in?—A. The existing tanneries here are on a very, very small scale and but for the war all these tanners would have been bankrupt already.

Q. Without war conditions these experimental factories would be at the same disadvantage?—A. I suppose they might be.

Q. Do you think that a trade which requires help in so many ways both by way of interest guaranteed and the imposition of export duty deserves to be fostered?—A. That is really on account of the military importance of the trade. I think it would be a very good thing to develop the industry by any means.

Q. If the Government started a school of tanners and made the facts connected with his trade known, don't you think that it will attract private capital in time?—A. I think it would take a very long time.

Q. If in addition to establishing the tannery school Government put on an export duty on hides then the trade would develop better?—A. Then you would have a very large development of the tanning industry at once.

Hon'ble Sir Fazulbhoj Currimbhoy.—Q. Do you think that the raw hides secure better prices than the finished article?—A. As a matter of fact that is what happened. The Germans used to pay higher prices for the raw hides than the tanners could get for the finished article.

Q. Do you think that if the Government sells the articles it could do so at a profit?—A. I could not say what exactly the profits will be.

Q. You say that there is no large market here?—A. You might create one.

Q. Don't you think that if the Government takes up the thing and if it is not able to sell the stuff it would lose heavily?—A. What I say is that Government must be prepared

to lose a certain amount of money. I do not say that it will be a profitable proposition. The actual details will have to be worked out and the whole thing will have to be done very carefully. You cannot say anything definitely until the actual details are settled.

Dr. E. Hopkinson.—*Q.* If tanneries were established in India, would shippers buy hides and tan them here or would they continue their present business in shipping raw hides?—*A.* They may do either. They may send them away as raw hides or have them tanned here and then ship them.

Q. In the latter case the tanners would buy the hides?—*A.* Yes.

Q. Would not that require a large amount of capital?—*A.* Yes, unless you can get the banks to make advances. I do not know if the shippers have enough capital. Most of the shippers work on a system of advances. They purchase hides and the banks advance against them.

Q. You suggest that it would be impossible for the tanner to select the hides himself?—*A.* It would be an advantage if they had experience in doing this. As a matter of fact it does not very much matter. There are only two or three firms that are of any great importance as shippers.

Q. In what way does it not matter?—*A.* They would be as pleased to take the tanned hides for shipment as the raw hides. I do not think it will affect them at all.

Q. How are hides sold in the market?—*A.* I do not know. At present they are selling them "all round" to America in one or two instances.

Q. Are they sold by auction?—*A.* In Hamburg I believe they were sold by auction.

Mr. C. E. Low.—*Q.* We had information from the Board of Trade that the tanners in Germany dare not buy except through these exporters in India and that the shippers in India did not sell to anybody except the Hamburg people. It was proposed by certain firms in London to the Board of Trade that the auction system should be held in London. They said that the auction system is the only way in which you could do it successfully in competition with Germany?—*A.* That was exactly the position with regard to the trade here. Practically all the dealers were in the hands of the importers in Hamburg. They would not sell to anybody else.

Dr. E. Hopkinson.—*Q.* Do you make these suggestions for the establishment of tanneries in India simply in order to create a new industry in India or is it with a view to provide better means for getting hold of the English market?—*A.* What I was really considering was the letter from the Government of India in which they asked for suggestions that could be made towards removing the control of the trade in German hands. It seems to me that the only way of doing this is to develop a large tanning industry. I believe the tanning industry has been very successful in Germany and Austria. I do not see why we should not do the same thing here. I do not know of any other way of doing it.

Q. You mean to say that English tanners will not take Indian hides?—*A.* Practically that is the position. I do not know if the position has changed since. The Board of Trade was asked if the English tanners would take these hides and they replied that they would not. In England they used to take the tanned leather from Germany and work it up.

Q. From your own experience you have found that the English tanner has not taken Indian hides?—*A.* At present he has not. The idea was rather that he should be persuaded to do so. I think it would be more economical and much more to the benefit of this country if we took up the tanning here. My idea was that we should turn out leather in precisely the same state in which it was received in England from Germany before the war. Most of the hides went to Germany and Austria and the leather was taken from them after it had been tanned. My idea is simply that we should cut out Germany and Austria and send the leather straight from here. None of the English tanners appear to be anxious to take the matter up.

Q. Are we to understand that the Germans did not buy their hides in the mofussil but from the godowns?—*A.* I believe they had selectors in the mofussil but the great majority of them bought straight from the godowns. Some of the shippers have branches at places like Dacca. I do not know very much about that. There are some agents up-country. They buy on the system of advances I think.

Q. But the bulk is bought at the port?—*A.* Mostly they were bought here in Calcutta. At the time I came to know about them the German firms were not working. I cannot say from personal experience what their methods were. They were all closed by the time I began my enquiries.

Mr. A. Chatterton.—*Q.* There has been a considerable increase in the price of hides recently?—*A.* I believe so.

Q. Is that due to competition of German buyers or is it due to other causes such as the shortage of hides in the markets of the world?—*A.* I am not competent to say. I think it is due to competition.

Q. You say that the hide trade is mostly in German hands and that the German firms find it very profitable. Is it due to the fact that in Germany not only the manufacture of leather has been greatly advanced as a technical industry but the Germans have also paid a very large amount of attention to the utilisation of very inferior materials?—*A.* I believe they have carried the tanning of inferior materials to a very high point.

Q. If we are to establish tanneries here and if we are to make the same amount of profits we must be prepared to carry the development to the same high pitch?—A. I think we must.

Q. It is not merely a question of setting up tanneries but we have also to get the subsidiary establishment?—A. I think we should have to finish the leather completely.

Q. Have you any information regarding the imports of leather into India?—A. I have not got the figures here. I do not think they are very large.

Q. If we want to do anything here we must go a good deal further than the mere establishment of tanneries?—A. My idea is that we must go as far as Germany.

Q. You know that there are a certain number of tanneries in Bengal, such as the National Tannery in Calcutta and so on?—A. They are very small.

Q. The National Tannery, for instance, is turning out very good class of leather?—A. Quite a good class of leather.

Q. And there are other tanneries in various other parts of India doing the same thing?—A. The Berhampore Tannery is also turning out a very good class of leather.

Q. There are several good tanneries in the south of India and altogether the trade in these tanneries amounts to 20 lakhs a year?—A. The trade in Bengal is very small.

Q. This Berhampore Tannery is turning out half a lakh worth of leather a month?—A. It has just started.

Q. I am given to understand that it will be turning out a lakh a month and it would be rather difficult to set up Government tanneries in competition with tanneries of this kind. There are several difficulties in the way. First of all you want trained labour for running the tannery and it would take considerable time to train the men. During the process of training a considerable quantity of leather and hides will be spoiled. Then the other difficulty which the people in the hide trade experience is that if they train people they will have to lock up a very large amount of capital during the process of tanning?—A. I think that would be the case.

Q. They are asking that some special facilities should be given for providing this capital on practically non-commercial terms at a very low rate of interest. They want a permanent advance against the stocks. They want to get the advance from Government at a very low rate of interest, a lower rate at the outset than a bank could possibly accept. Their contention is a fair one. They would have to spend a very large amount of money in training their labour and they practically ask that Government should give them a grant for the purposes of training this labour. Is that a way in which Government might assist?—A. If the labour was going to be trained Government might assist. I tried to import some labour from Madras and the cost was prohibitive.

Q. If Government contemplate doing anything in this direction, they will have to put a specialist on to the work?—A. I think they must put on an expert in order to work it out.

Q. The third difficulty that is suggested in this connection is that at the present time tanneries like the National Tannery and the Berhampore Tannery and the Mysore Tannery are making high class leather for export?—A. I do not think the National Tannery exports much. It makes most of it into boots.

Q. Whether they are exporting or not the development of the industry will involve the introduction of a new system of sorting and classifying hides for the export trade as all the best hides will be retained by the tanners?—A. I do not think it would work satisfactorily unless the tanners were prepared to take all kinds of hides.

Q. In that case it means that we have got to find out new methods of utilising the inferior kinds?—A. That is why I suggested that a technical institute should be instituted to work out the question.

Q. It is a matter for a company to start experiments with a view to creating a market for these things and that is where possibly Government help in the form of a subsidy would prove useful to meet the initially non-remunerative expenditure. There is no doubt that whatever is done there will be a large amount of pioneer work. You want to find out what the German trade was doing?—A. I think it is necessary to find out what their processes were.

Q. Their processes are fairly well known and what they do with their products is not so easily determined?—A. One difficulty I found was that I could not get any information as to the processes that would be suitable for a place like Calcutta for instance.

Q. You suggest that the probability is that the whole industry will have to go to chrome tanning?—A. I think it would be more profitable so far as I can see. Chrome tanning is very quick.

Q. It is only suitable for the better class of hide?—A. You know much more about these matters than I do.

Q. Your suggestion is that the imposition of an export duty is a necessity during this period of experimental work. Have you contemplated the amount of raw material?—A. I have not worked that out at all.

Q. There are two points which are mentioned in the correspondence with the Director-General of Commercial Intelligence which have not been touched upon. One was a suggestion regarding the correspondence from the English tanners. The correspondence showed that the

English tanners wanted to have the hides from India secured to them on cheaper terms than the Germans paid for them and they suggested that in order to effect this an export duty should be put on the hides with a rebate to those who exported?—A. I do not think I have that in the papers which I have. The two suggestions made were that the export of these hides should only be allowed to particular firms and that they should be sold by public auction and that the carrying trade should be reserved to British vessels. I have not got anything here about the rebate.

Hon'ble Pandit M. M. Malaviya.—Q. That was a suggestion from individual firms?—A. That was a suggestion from one of the firms.

Q. Do you think you can support that proposal?—A. The whole of my note has been written from the point of view of India and not that of England.

Q. Do you think that an export duty with rebate would not work?—A. I think India would object to it.

WITNESS No. 178.

Hon. Mr. W. A.
Lee.

THE HON'BLE MR. W. A. LEE, *Messrs. W. A. Lee & Co., Calcutta.*

WRITTEN EVIDENCE.

Financing of
industries.

The form in which Government assistance should be given should be separately considered for each project, as these will present so many new features from time to time as to make it difficult to lay down rigid rules. The only rule which should never in any circumstances be departed from is that it should always be a condition of Government assistance that it should be of the kind that will best foster private enterprise. It would be a misfortune if the first order if the result of Government help were to make the people more dependent on the Government and unable to carry on the enterprise that the Government had initiated.

Regarding the methods of giving Government aid mentioned in the list of questions :—

(1) Money grants in aid should generally be given only for—

- (a) preliminary investigations in connection with an industry,
- (b) experimental work,
- (c) starting a pioneer or experimental factory.

(2) Bounties or subsidies may be given for a definite period when it is doubtful whether a factory will be profitable, and capital is not otherwise forthcoming to start it. They should be continued only if the sum paid in wages exceeds the subsidy, or if the industry subsidised is one of a related cycle of industries, and is necessary to the existence of one or more other industries, but cannot be profitably conducted without the subsidy.

(3) Guaranteed dividends are undesirable. It is undesirable that the Government should guarantee the results of trading. It is putting the State in the position of an ordinary trader, taking all the risks while everybody else concerned simply accepts the Government guaranteed results. This tends to destroy and eliminate private effort.

(4) Loans should always be *with* interest, and in most cases this will be the most desirable way of assisting in the establishment of new factories.

(5) The supply of machinery, etc., on the hire purchase system is generally not desirable. It is equivalent to a loan of money repayable in a stated period, which is a simpler transaction.

(6) The provision by the Government of part of the share capital is not desirable. It would make the Government permanently a trader, instead of leading and directing private trading.

(7) Government purchase of the products of a new factory should always be guaranteed if the Government is a purchaser of the products, but the Government should never guarantee purchase of products not required by the Government.

Government control.

Whenever Government assistance is given in forms (1), (2), or (4), there should be Government control of the enterprise, either by complete Government management where practicable if the Government is paying the whole cost, or, if the Government only provides part of the cost, then preferably by the appointment of a Government director on the Board of Directors of the joint stock company owning the enterprise. The Government director should have a complete power of veto of all financial transactions of the Board of Directors of the company.

Pioneer factories.

Generally speaking, Government should only undertake pioneer factories experimentally, for the purpose of demonstrating whether a given factory process can be successfully worked commercially, and should be on the smallest scale compatible with the need for the demonstration to be commercial and not of the nature of a laboratory experiment. When the demonstration is complete, if unsuccessful the factory should be closed; if successful the necessary steps should be taken for the formation of a factory under the management of a joint stock company, either by enlargement of the pioneer factory or by the construction of a new factory of the necessary dimensions to ensure economic success.

Private capital is readily obtainable for an industry which is well established, chiefly from Europeans; if a European firm puts forward a satisfactory project, but for a new industry, or one in the experimental stage, Indian capital can only be obtained by—

- (a) the promoter employing his own capital,
- (b) the promoter inducing capitalists to invest as a personal favour, or as a patriotic contribution, or by holding out the prospect of large profits,
- (c) a firm forming a joint stock company under their management.

The quantity of Indian capital available for enterprises but the capitalists have not themselves any commercial knowledge or experience, and they distrust industrial proposals, knowing that even if honest the promoters may lack the necessary knowledge and ability to achieve success. But if a project came before them with the approval and financial support of the Industries Department of Government the capitalists would know that the project had been examined by capable independent persons and that there was every reason to believe it would be conducted with ability and honesty, and that it had so far commended itself to the Government officers who examined it that the Government were able to afford financial support. With this lead by the Government, Indian capitalists would, I believe, have confidence in industrial ventures and invest freely in industrial concerns.

Industrial undertakings are now assisted by European banks chiefly in the purchase of raw materials and in the marketing of the products. The European banks do not exist for the purpose of providing funds for expenditure on capital account. Their business is to finance trade, not the construction of factories, and it would not be proper for such banks to lock up any large part of their funds in such capital expenditure. Securities upon which they advance money must be of a kind that can be readily realised. Deposits may be withdrawn, and the manner of their employment must therefore be such that the money will be available whenever required. This is the theory upon which British banks have always based their operations, and the exchange banks keep more or less closely to this practice.

The joint stock banks domiciled in India do not in all cases employ their whole funds for financing trade, and they are able to use a part of their funds for loans which represent capital expenditure. But very much more is desirable in this direction, and the establishment of banks whose financial arrangements would permit the employment of considerable funds in the shape of loans for capital expenditure is very greatly to be desired. It is often not easy to obtain all the capital required for a new venture, and if a financial institution could be found to furnish a definite portion of the capital (the proportion differing according to the security) it would be so much easier to obtain the remainder.

Even for financing trade movements banking institutions are not found in many places where they might be expected. For instance, within a radius of 12 miles from the centre the movement of money is upwards of a crore in the year, but there is not a bank in that area.

New factories should not be constructed with exclusively Government capital unless they are for a new industry or an industry in which it is desired to demonstrate a new process. This will not compete with progressive private enterprise, and Government aid to any industry should always be of the form that is calculated in that particular case to conduce to the greatest development of private enterprise.

There should be no limitation to Government aid to a new enterprise because it competes with an established external trade. It should be the deliberate aim of the Government to establish industries which will compete with external trades, with the exception that no assistance should be given to a new enterprise, beyond that needed to demonstrate its commercial practicability, if it competes with an existing external trade with some other part of the British Empire, unless it is an industry on which another desirable and practicable industry depends.

I know nothing of the rules by which the purchase of anything by the Government is supposed to be regulated, my experience is of only one article. I was interested in a project for a factory to manufacture in India a requirement of railways. Plans were prepared, and the capital was partly arranged. The President of the Railway Board was consulted and he advised us that, unless the Secretary of State so directed, the Government of India would not be able to purchase from us, and it was also pointed out that the railway companies, whose offices are in London, would be extremely unlikely to purchase from us in any circumstances, so that, although we were confident of being able to provide an article of equal quality at a less price, it was hopeless to expect that we should be able to sell our manufacture, in spite of the fact that the Government of India is the owner of the railways and provides, alike for the state-managed and the company-managed lines, the capital which would be expended in the purchase of our product.

The project was therefore abandoned.

There is no organisation in this province, nor in the province of Bihar and Orissa, for the development of industries. I proposed to the Government of Bihar and Orissa a couple of years ago that a Department of Industries should be formed in that province.

There should be a Board of Industries, composed of—

- The Director of Agriculture,
- The Registrar of Co-operative Societies,

The Conservator of Forests,

Six commercial men (if so many can be obtained).

The functions of the Board of Industries should be—

- (a) executive, the disposal of the funds available for aid to industries, except the limited sum which may be within the personal authority of the Director of Industries;
- (b) advisory, to advise the Director of Industries on all matters connected with the working of his department.

There should be a Director of Industries, the executive officer of the Board of Industries. He should be a business man, not an official, and not necessarily an expert. It is more important that he should have a general knowledge of industrial processes than that he should be an expert in any one industry.

The Director should convene and attend meetings of the Board of Industries at regular intervals, and the work of his department should be brought to the notice of the Board at its periodical meetings.

There would be many advantages in an Imperial Department of Industries with a branch in each province. No important work can be done by a Director of Industries involving the expenditure of a considerable sum of Government money without a grant from the Government of India, and it would be convenient in some respects to have the money spent directly by a department of the Government of India instead of being handed over to a provincial department to spend. It would also be easy to correlate the work in different provinces, as it would all be the work of one department, and there would be no chance of work of any kind being repeated in different provinces, to which there is an inevitable tendency with different provincial departments.

A branch of an Imperial department in any province would have the disadvantage, on the other hand, of being dissociated from the provincial Government, and it is undesirable for the local administration to be separated from all commercial interests. It would be of advantage to industries that they should have the sympathy and active help of the Provincial Government, that the provincial Government should be directly concerned in the industrial enterprise of its own province. There is, moreover, a great deal of provincial patriotism abroad, which finds expression in a craze for decentralisation, on account of which a proposal for provincial branches of an Imperial department will meet with considerable opposition apart from its merits.

If provincial branches of an Imperial department are not formed, there should be in each province a Department of Industries, of which the Director of Industries should be the head. He should report to, and take orders directly from, the head of the provincial Government, and not through the Secretary of another department, *e.g.*, Revenue or Finance.

The provincial departments should work in correspondence with and communicate direct with the Imperial department (not through another department, *e.g.*, Finance) and all important experimental and investigation work should be previously reported to the Imperial department so that duplication of effort in different provinces may as far as possible be prevented. Each province should then be advised by the Imperial department regarding the intended programme of experiment or investigation in every province.

The Imperial department may be obtained by dividing the present Department of Commerce and Industry into a Commerce Branch and an Industries Branch, each with quite separate organisations. The new Industries Branch, or Industries Department, would be similar in some respects to the Railway Department, and be similarly regarded as a technical department.

The head of the Imperial Department of Industries, like the provincial Directors, should be a business man. The functions of the Imperial department would be to control the scientific departments, and the technological research institutions, and to assist the provincial Industries Departments so as to secure co-ordination, and to allot grants for special purposes to the provincial Industries Departments.

Each provincial Department of Industries should obtain the most recent technical literature in connection with all the practicable industries of that province, except such as are already developed by financially strong corporations, *e.g.*, tea growing, jute weaving, or gold or coal mining. Catalogues of these provincial libraries should be in the Industries office of each province, so that any Director of Industries may know where to refer for information that happens not to be in his office.

The publications of every provincial Department of Industries should be listed for public information by the Department of Industries of each province.

All technical schools should be under the control of the local Department of Industries, and not under the literary Department of Education. The Education Department should not control engineering or other technical education any more than it controls medical education. The Department of Industries may be expected to know what technical education is required at each centre, and we may hope for the disappearance of the present conditions under which a technical teaching institution is formed and to justify its existence students who have no aptitude for the particular study are induced to join.

There should be scientific technical departments for—

Technical and scientific departments.

- (a) Geology,
- (b) Chemistry,
- (c) Botany,
- (d) Physics,
- (e) Zoology,

which should be Imperial, and under the control of the Imperial Department of Industries. It is important that the control of these scientific departments should be commercial, because a scientific department is always in danger of being purely scientific. The tendency of a scientific man is always to think of his science, and to disregard or disdain its sordid economic application, and control by a purely commercial department will act as a very desirable corrective to this tendency, a tendency which could easily be illustrated from the past history of a scientific department in this country.

There should also be technological research institutions, perhaps four. Their location could only be decided after careful inquiry and consideration of the conditions. An effort should be made to locate them in or near to the largest commercial centres. Each technological research institution should specialise in the subjects most important in the part of India in which it is located, and should be staffed with trained specialists, so that an enquiry on any subject would be sent, not to the nearest research institution, but to the one that specialises in that subject. It would be necessary to consider to which, and if to more than one institution, a chemical research laboratory should be attached, and each chemical laboratory, if more than one is established, would be required to specialise in certain products or compounds. The point I wish to emphasise is that investigators in a chemical research laboratory, for example, should be specialists, and not general practitioners. We do not want in this century the chemical maid of all work as an investigator. Valuable facts may be obtained by the employment of a chemist who is not a specialist, and who one day is working on metallic binary systems, on another is experimenting on wood distillates, and on yet another is required to investigate a methylene dye, but any success obtained by procedure of this kind would be an accident. For this reason a small chemical laboratory in every province would probably be a waste of money; investigations can be so much better carried on, and with much better chance of useful results, in a fully equipped laboratory with a full staff of specialists.

The technological research institutions should not be allowed to develop independently. This would involve waste of effort, the work not being done where it could be done most advantageously, and, more important still, it would not be possible for the different institutions to specialise to the same extent. The institutions should be under the control of the Imperial Department of Industries. There is no other way to obtain the necessary co-ordination of effort except by the control of a central office, and as the institutions are established for the purpose of economic investigation the appropriate controlling head is the Imperial Department of Industries.

The meeting of the Indian Science Congress should be made the occasion for the staffs of the technological research institutions to confer about their programmes of work. Valuable suggestions are likely to be made as to where certain work can best be done and how certain problems can best be attacked. I am not sure as to whether this should be allowed to develop naturally or whether it should be made the subject of definite proposals.

It may very probably be necessary from time to time to send Government technical experts to study conditions and methods in other countries. It would not be desirable, under any circumstances that I can foresee, for Government to send technical experts of private firms to study methods abroad.

Provision should be made for all research to be conducted in India, not in the United Kingdom, but it may at any time happen to be necessary, on account of inadequate provision in India, to have some researches made in the United Kingdom.

The loan of Government experts to private firms or companies should be for a definite purpose and for a limited specified time, and the firm or company should pay the amount of the remuneration of such expert for the time his services are lent. A Government expert should not be *entitled*, until the expiry of, say, 5 years, to publish the result of researches made while attached to a private business, if the private business pays for him as above.

When the services of an expert are lent by the Imperial department to a provincial department, the expert should be attached to the provincial Industries Department, and should work under the orders of the Director of Industries.

I do not think there is any need for a college of commerce in Bengal, and I believe that the establishment of such a college would not assist, but would retard, industrial development. It will be time enough to consider the establishment of such an institution ten or twenty years hence.

The importance of economical transportation cannot be overestimated. But it is not Transportation enough that it should be economical, it must also be reliable. Unless there is in the minds of the users of transportation a feeling of security that transport will be available when required there cannot be that confidence which is the first condition of unfettered commercial progress. If there be, as there now is, a feeling of doubt, consciously or unconsciously,

whether when goods are offered for transport by railway they will be conveyed or be kept waiting an indefinite time, there is wanting that confidence without which a commercial venture is removed from the ordinary transactions of trade and becomes a gamble.

A railway, like any other mechanical contrivance, works most economically when it is fully and continuously employed. It is therefore the aim of every railway administration to provide such facilities, such rolling stock, as shall always be fully loaded and never be idle or spare. But practically all Indian products are seasonal, with the exception of coal, the production of which does not vary so greatly month by month, and there is therefore not a uniform quantity of traffic available in each month. The attempt of the railway administration to keep their rolling stock fully occupied, so that their records of wagon duty shall not fall below a very high standard, results in the provision of rolling stock just a little more than is necessary to carry their average traffic, distinctly less than is necessary to carry the traffic offering in the maximum month. It is therefore the deliberate programme of Indian railways to provide for something less than the expected traffic, and if there happens to be a specially prosperous year the railways are hopelessly overburdened.

It would not be reasonable to expect a railway to provide transport capacity so much in excess of current requirements as to be able to cope with the traffic offering in a year of a great trade boom, but in the anxiety of railway officers to surpass their records of wagon duty and never have an idle wagon they restrict trade and force upon all traders a feeling of uncertainty and an absence of confidence that goes a long way to injure trade. It is probable that so far from this policy being the most profitable to the railway, the provision of more transport capacity would result in more total traffic and more profit. Instead of providing transport estimated to be sufficient for a good deal less than the expected maximum demand, it is probable that it would be more profitable to provide for nearly as much as the maximum demand (a rapidly increasing figure), although the wagon duty would not be so high, and would perhaps be the subject of adverse criticism by officials in London, who may still (as they used to) like to see records showing a high average of wagon employment, regardless of the circumstances of the case. Even if the actual net profit realised by the railway were not proportionately greater, the beneficial effect on trade of a transportation agency able to meet all demands would be very great.

Provision of rolling stock of course connotes provision of facilities for handling them, but these do not appear in "duty" statistics, and are not subject to the same objections on the part of railway men as the provision of a full complement of rolling stock. All expenditure on increased transport capacity is, however, subject to the established practice of only, providing the very least with which the railway can deal with immediate needs. This used to be the admitted policy, it survives as a general practice.

For many years the Calcutta commercial organisations have urged the railway administrations to increase their capacity *relatively to the trade demand*, and have urged the Government to provide the necessary funds. Year by year we have endeavoured to persuade the Government to take a more reasonable view of the importance of ample transportation capacity and have punctuated our prayers with special illustrations from time to time, as in 1912 when we obtained the appointment of the Coal Traffic Conference to bring home to the Government the special shortcomings of the local railways in coal transport capacity. It is only by dint of ceaseless worrying, continual re-statement of demands, incessant reiteration of requirements, that we have been able to get the railways brought up to the capacity they have reached, but all this ought not to have been necessary, and would not have been necessary if the Government of India had any real appreciation of the part that is played by transportation agencies in the prosperity of the country.

We cannot expect railways to be liberally treated during the war, but the provision of three millions for the current financial year is so small that a feeling of deep disappointment cannot be avoided. Disappointment not only because the country will lose so heavily in consequence, but still more because it seems to betoken a continuance of a point of view that one might have been forgiven for hoping was a thing of the past. It is disheartening to find it even now not realised by the Government of India how deficient transport hampers and strangles trade out of all proportion to the deficiency.

I venture to commend to the notice of the Commission the address of Major Hepper, R. E., to the Railway Conference at Simla this year, and in particular the following expressions:—

"The industrial progress of a country is limited by its communications."

"The plain fact, as I see it, is that the possibility of any substantial increase in the volume of business must continue to depend on the ability of the railways to handle it, and that if more rapid progress in this respect is to be assured, it will be necessary, after the war, to adopt a bolder and broader policy of railway development."

Waterways.

All means of transportation, railways and rivers, ought to be considered together, and worked in unison for the efficient conveyance of everything needing transport. Hitherto the railways have been allowed and encouraged to develop separately and in competition with rivers. By railway officers the rivers are only regarded as obstacles to be bridged, or as carrying traffic which railway strategy may succeed in filching, and large sums have been spent on railway lines whose only excuse for existence is that they can pay for their construction by short-circuiting traffic that could equally well be carried by river. The worst

example is, of course, the Assam Bengal Railway. It was designed to live upon the traffic which was carried on the two great rivers which flow through the two cultivable areas, and sanctioned on obviously inadequate estimates of cost, and after twenty years of working, in spite of efforts on the part of the Government and the working company to the contrary, the river traffic has gone on steadily increasing. Sixteen crores were spent on the construction of this line, which has failed altogether to do that for which it was intended, failed even to cover its interest charges, the loss on which to-day amounts to about seven crores.

This railway is only an example, the most conspicuous because the greatest failure, of the wasteful policy of constructing railway lines to compete with rivers instead of building them so as to make the greatest use of the rivers. This policy is as active as ever, and lines have recently been built, and others are being surveyed to-day, to carry traffic which is carried by water, and for no other reason. This involves at least the expenditure of capital which could much more usefully be employed in providing transport in places where there is not a railway and perhaps few roads.

The manner in which rivers have always been regarded by the Government is illustrated from time to time in various ways. About the same time as the Standing Committee for Waterways was formed to advise the Government of Bengal respecting waterways (if any matter was submitted to them for advice), the Government of Assam convened a conference on the improvement of communications. To this conference were summoned representatives of everybody in the province interested in transport or in goods with one single exception, no one connected with water transport was invited, although the trade of the province by water is in many respects more important than that by rail. Even in the formation of the Standing Committee for Waterways something of the same point of view is apparent; the Committee includes a "representative of the railway interest," it being apparently feared that a waterways committee might to some extent interfere with the ruthless disregard of the value of water transport that had hitherto characterised the attitude of railway administrations.

To counteract the adverse view of the railway interests, and to ensure that in future transportation questions shall be regarded as if railways and rivers were part of the same organisation, there seems to be no other way but the creation of a strong river organisation, either a Trust or a Waterways Department of Government. The financial difficulties surrounding a Trust are very great, perhaps insuperable, and there are difficulties about the control. The Calcutta Port Commissioners are practically a department of the Government of Bengal, but the great rivers running into the delta of the Ganges run through four provinces and which of these would control the Trust? The personnel of the Trust would also be a difficulty, the only members who would take a constant interest in its proceedings would be the representatives of the river steamer companies who would therefore virtually constitute the membership of the Trust. Provincial Waterways Departments would be useless because the four provinces could not agree upon united and uniform action without wasting time in protracted discussion of every point, and probably not even then. It appears, therefore, that the formation of an Imperial department of Government charged with the care of rivers is the only possible way in which the present apathy, or active hostility to waterways, can be counteracted. Such a department would not be allowed to fall entirely into the hands of river transportation organisations because rivers have other uses besides being carriers of merchandise. The part played by rivers in the physical, agricultural, and sanitary development of a country is gradually being understood, and a department of the Government of India whose duty it would be to care for all the interests of the rivers and all that pertains to them would have to regard the influence of the rivers in their effect upon the country, upon its physical features, upon its productive capacity, and upon its sanitary condition, as well as their use for purposes of economical transportation. No one function of the rivers would be permitted to override or obscure the importance of the rivers in their other functions, as would be the case if a controlling body were constituted to deal with rivers in one aspect only, *e.g.*, navigation.

The importance of such an Imperial department cannot easily be over-rated, the exceedingly insanitary condition of the Nuddea, Jessore, and Murshidabad districts, for example, has been ascribed to the neglect or unwise treatment of the rivers, and this ground alone would be a sufficient reason for the appointment of a competent controlling authority in charge of rivers, apart from the improvements that might be effected in other directions of river activity. The sanitary condition of an area reacts on the industrial condition of the area, and hence may come within the purview of the Industrial Commission to the extent of making it desirable to recommend that the authority to be constituted to have charge of rivers may be such as to efficiently control all the activities of the rivers, including those which influence the productivity of the soil and sanitation.

All industries, excepting only (to a great extent) agriculture, require power, cheap power, and without cheap power, no country can become a manufacturing country or a wealthy and strong country. Even if we establish manufactures now, these will have to be abandoned if cheap power is not continuously available, and India will revert to the position of an almost purely agricultural country, dependent to a large extent on the September rain for its annual prosperity. Pc

Power is now obtainable from the combustion of fuel and from water falling under the action of gravitation. On the western coast of India, with considerable areas at an elevation of over 1000 feet, and with fairly steep slopes to the lower levels, there are great opportunities

for hydro-electric installations which may provide a large amount of power, whereas on the eastern coast with the country running down to the sea in a gentle slope, broken here and there by ranges of hills, there is not the same possibility of making use of water power, and the Himalaya with their high ridges and deep valleys do not lend themselves, speaking generally, to large water power schemes. Nothing has been done to make use of the available water power on this side of India, and very little is known of the possible sources of supply. Calcutta and district use more than 200,000 horse power, the increase having been over 10 per cent. in the last 10 years, and perhaps as much as the present requirement of Calcutta could be provided hydro-electrically. While our coal is comparatively cheap we are not compelled to look for suitable sites for hydro-electric installations, but it would be well to have the country within, say, 200 miles of Calcutta thoroughly examined so as to ascertain exactly what water power we have available to fall back upon, and so that hydro-electric schemes where practicable may be put in hand, and as much as possible of our cheap coal saved for the future and for the many uses where water power cannot be applied. Hydro-electric power, provided it is cheap, also makes several industries possible, *e.g.*, the manufacture of aluminium which may well be undertaken in India, also other processes in electro-metallurgy.

The fuels in use are wood, petroleum, and coal. Of these, wood is too valuable for other purposes to make it desirable or even possible to use it to any great extent for power purposes. Petroleum is very convenient for small units, but the principal oil fields now being worked are showing signs of exhaustion, which, though not imminent, yet renders it unwise for us to regard petroleum as likely to afford a cheap fuel for an indefinitely extended future.

There remains only coal, and in coal of a good quality this country is extremely poor. Coal is of course mined in the manner that brings the largest profit to the miner, and the miner is naturally unable to consider the country's future, his duty is to extract the coal in such a way as to bring the greatest return on the capital employed, within the time available to him. Unfortunately this is hardly ever the method which makes the best use of the country's store of coal, because it is generally more profitable and always more easy to extract only part of a seam and leave a very considerable percentage of the coal underground, where it is permanently lost, than to take out all (or nearly all) the coal in a seam.

The need of the country for cheap power being vital beyond all other industrial needs, and it being impossible to replace coal for power production for many purposes, the poverty of the country in good coal makes it of extreme importance to protect the country's store of coal in every possible way, and to see that none is wasted by methods of mining which abandon and render useless and inaccessible a large percentage, and one of the most important duties of the State is to secure the future by close control of the coal in the country.

It is difficult now to interfere with the manner in which coal is mined in the coalfields already being worked, on account of the dislocation of acquired rights which interference would cause, and it is therefore too late perhaps for useful action as far as these coalfields are concerned, but there are coalfields yet untouched which constitute the country's reserve of coal and there is no reason why the State should not acquire control of these, a course which two years ago I urged upon the Government of Bihar and Orissa, in which province lies the coalfield containing probably the largest quantity of untouched good coal in India.

There are several ways in which the mining may be controlled--

- (a) Legislative enactment may prescribe the way in which the coal may be mined.
- (b) The mineral rights may be purchased by the State and resold at once, the State prescribing conditions under which mining will be permitted. This would not entail any outlay of State capital.
- (c) A third alternative is for the State to purchase the mineral rights and to lease out suitable areas to mining companies, prescribing the manner of working. This would require the outlay of a considerable sum for acquisition, but it would have several advantages. In the first place it would result in a very large profit to the State from royalties as soon as these reserved coalfields began to be worked. Secondly, it would prevent small areas of coal lands from falling into the hands of persons financially weak, and who consequently, even with the best will in the world, are unable to scientifically work their mine and do justice either to the property in their possession or to their own limited capital. Coal mining is an enterprise for persons or corporations with large capital, and it is not to the benefit of the State that others should be permitted to attempt it. Thirdly, as all the mining companies would hold leases from the Government there would be security of title, whereas hitherto, with the best legal advice, there has been the greatest uncertainty, and titles which when they were purchased were believed perfect have been successfully attacked in the law courts.

The conservation of the country's store of coal is not a pressing matter to-day, but a generation or so hence it will be an extremely pressing matter, and will be forced upon the attention of power users and the Government, but then the progress of the public demand for power will have used up the cheap good coal now in sight, and most of the coalfields now untouched will have been settled and work in them commenced, and it will then be too late to do what it is possible, indeed easy of accomplishment, to do now.

With reference to the last question in the list, the increased manufacture of castor oil would reduce the large quantity of lubricating oils now imported for, *e.g.*, railway axle lubrication. The manufacture of castor oil would be increased if it could be cheapened. It could be very considerably cheapened if the bye-product, the oil-cake, could be made more valuable. If its medicinal qualities could be neutralised, the oil-cake would be an extremely valuable food, and the destruction of its medicinal properties would therefore form a suitable subject of investigation in a chemical research laboratory.

ORAL EVIDENCE, 10TH JANUARY 1917.

Mr. C. E. Low.—*Q.* With reference to the first heading, "The Financing of Industries," would you agree that money grants-in-aid by Government, or bonuses, or subsidies should preferably be given when the company has got the expert, and it is not possible for Government to get one. How does that point of view strike you?—*A.* Yes, I think that would be reasonable.

Q. Expert assistance should be given of course freely, but direct cash assistance should be given, with a view of getting something out of the concern in the public interests, *viz.*, the establishment of the possibility of a proposition by reason of the fact that the company has got the expert assistance available. It might not be convenient for Government to employ the expert; they might say to the company, "If you will engage the expert, we will give you a grant-in-aid"?—*A.* I think it would be quite easy to imagine circumstances under which any of these possible forms of aid might be desirable.

Q. But when it comes down to formulating a criterion, one would be very glad of any point like that which bears on it. With reference to your point 5, you are not in favour of supplying machinery on the hire purchase system. Would you extend that restriction even to small cottage industries?—*A.* Oh, no; certainly not.

Q. Or things like small power crushing factories for zamindars or a small association of ryots?—*A.* No, it must be quite a convenient way in such a case, because it would provide security for advances.

President.—*Q.* Another point is, supplying the small man with machinery on the hire purchase system would enable Government to give a certain amount of advice as to the kind of machine he should take?—*A.* Yes.

Mr. C. E. Low.—*Q.* In the case of small plants, Government would presumably have a Department to look after it and see that nothing happens to it, and the nearest Government mistry could be called in?—*A.* Quite so.

Q. You say, "But if a project came before them with the approval and financial support of the Industries Department of Government, the capitalists would know that the project had been examined by capable independent persons, and that there was every reason to believe it would be conducted with ability and honesty, and that it had so far commended itself to the Government officers who examined it that the Government were able to afford financial support." Is that not rather a difficult thing to secure?—*A.* Exceedingly difficult to secure, but what I meant was that at all events Government thought it would be so.

Q. Supposing Government were unfortunately mistaken; the investor would have some ground for complaint?—*A.* I don't think so. What was in my mind was that they would regard it as more reliable than projects put before them by any private persons.

President.—*Q.* Would it not make Government officials unduly cautious?—*A.* It might.

Q. That is a very serious matter; a great deal of delays are sometimes due to excessive caution?—*A.* Yes, it might have that effect.

Mr. C. E. Low.—*Q.* A Government official enquiring into the position of the would-be promoter might say, "He is not an expert, and we have heard some bad reports about him," and that might perhaps put them off?—*A.* That is possible. Some caution might be wise on the other hand.

Q. Government might very well say that these people have not sufficient capital, that the supply of raw material and the demand for manufacturing products are satisfactory, but it would not be wise for them to say that this business will always be carried on honestly?—*A.* That was not in my mind at all that any body would say so. All that I meant was that if a project had been well examined and approved by a Government department, that it would convey to the investor a sense of—I won't say security—but convey the idea that at all events the project had been approved by a responsible person, and that there would be more probability of its being carried on with ability and honesty than one put forward by interested persons.

Q. In the last paragraph under the heading "Assistance by banks" I don't think I quite follow your last sentence. You say, "For instance, within a radius of 12 miles from the centre, etc." Do you mean Calcutta?—*A.* Oh, no; I was thinking of a particular place. I had the Jherria coal field in my mind. I mean the payments in cash to the people living there, as far as I know, amount to about a crore in the year.

Q. You say, "The provincial departments should work in correspondence with and communicate direct with the Imperial department (not through another department, *e.g.* Finance) and all important experimental and investigation work should be previously reported

to the Imperial department, so that duplication of effort in different provinces may, as far as possible, be prevented." I suppose you are aware that all these proposals come up to the Administrative department in the first instance, and if expenditure is involved, then the Administrative department consults Finance. Do you wish to remove Finance out of it altogether?—A. Naturally any proposition which would involve the Local Government in any expenditure would have to go through the Local Government and its department. That I quite understand. What I was anxious to avoid was the necessity for all communications to go through some other department.

Q. You say, "The Education Department should not control engineering or other technical education any more than it controls medical education." Do you know whether the Education Department take any share in that portion of the Medical Department?—A. I don't know, but am under the impression that the Education Department have nothing to do with medical education.

Q. The point of my enquiry is this that in engineering and technical education, as at present carried on, there is a very large amount of what I might call general subjects, chemistry, physics, etc., much larger, I fancy, than the share which general subjects take in medical education; don't you think that is the case?—A. That may be.

Q. It has often been put to us this way, that the Education Department work might be limited to those general branches, but the general control and all the strictly technical part of education, i.e., the general control of education, with a view to the kind of product you are going to turn out, should lie in the Department of Industries. Do you agree with that position?—A. Yes, I have no objection to the assistance of the Education Department being obtained. Personally I don't think it is necessary.

Q. With reference to your remarks about railway congestion, without in any way suggesting that the state of affairs hitherto has been satisfactory, is it not the case that in all countries there are considerable complaints about railway congestion, more particularly in countries where the market is of a seasonal nature?—A. Quite true at times, but not every year.

Q. Is there not always a complaint in the Argentine?—A. I am not sure whether they have annual difficulties there.

Q. Don't you think that apart from any question of trying to make the supply of fund more elastic, it would also be a good thing to spread the traffic a little more?—A. It certainly would, and perhaps by season rates to some extent.

Q. Do you still adhere to this, "the provision of three millions for the current financial year is so small that a feeling of deep disappointment cannot be avoided," in view of the present state of affairs?—A. Conditions are different now from what they were when I wrote this. I don't suppose the Financial Department, when they granted the three millions, foresaw the present position.

Q. Would the railway have got the materials if they had been given more money?—A. That I am not prepared to say now. Six or eight months ago I would have said that they would have been able to spend most of it quite easily.

Q. Under the question of waterways, you speak of the Imperial department's care of rivers. A rather different point of view was put before us this morning, viz., the appointment of a Trust to deal with the big block of riverways, the canals, and lower courses of the Ganges and Brahmaputra rivers. Don't you think that a localised body would be preferable to the Imperial department?—A. No, I don't think so.

Q. You don't think that the special knowledge and interest which you would be able to bring to bear, in case of a localised department, will be preferable?—A. I take it the same special knowledge would be available; the same officials would take part.

President.—It would not be possible to represent in that Imperial department the Bengal Chamber of Commerce.

Mr. C. E. Low.—Q. Then again an Imperial department would encroach a good deal on the functions of Local Governments, which the Trust would not do, because the Trust would be consulted by Local Governments?—A. A Trust would be a purely Navigation Trust. Would it not?

President.—Q. Mr. Low's point is that where you have locally a big group of interests fairly well defined and big enough for one Trust, then it is better to decentralise to that extent and hand over power to this big local concern, treating the others as independent propositions, would that not appeal to you more than an Imperial department interfering with all?

Mr. C. E. Low.—Q. They would fall under some department of the Government of India, presumably the Public Works Department, or Commerce and Industry. You have a Port Trust under the local Government which concentrates on the solution of local problems and you find a sufficiently large body of men to do it?—A. If you could have a Trust which would cover other functions of rivers than carrying traffic, I should prefer the Trust.

Q. That could be secured by the appointment of officers or persons representing those interests on the River Navigation Trust?—A. Yes. Perhaps it could, but I am not sure that it could.

Hon'ble Pandit M. M. Malaviya.—Q. You want a body that would take care not only of the rivers in Bengal but in the United Provinces also. You do not want the Trust to be an entirely provincial matter; you want that it should be so that it might take care of the rivers of the two provinces. It may be by sub-committees of the two provinces?—A. Yes.

Mr. C. E. Low.—Q. You say "while our coal is comparatively cheap we are not compelled to look for suitable sites for hydro-electric installations, but it would be well to have the country within, say, 200 miles of Calcutta, thoroughly examined so as to ascertain exactly what water power we have available to fall back upon." You have not considered the possibility of the future provision of alcohol as fuel?—A. Manufactured from wood?

Q. Or produced from crops?—A. No, I had not thought of that, because I did not consider that the quantity possible to obtain would be worth consideration.

Q. You are aware that crops, such as potatoes, have been modified in such a way as to give the maximum alcohol results. Would you think that that is a desirable line of work to be taken up in India?—A. I am not prepared to say off-hand.

President.—Q. You would say that it would cut into such food-producing crops, and if so it might be added to your list of substances that ought to be used only sparingly for fuel; therefore your argument still holds that there is a good case for making out hydro-electric developments?—A. That is so.

Mr. C. E. Low.—Q. At the end of your note you speak about trying to make castor cake more suitable for food and the destruction of its medicinal properties would therefore form a suitable subject of investigation in a chemical research laboratory. Are you aware that it is a very valuable sugar cane manure as it stands at present?—A. I know that.

Q. Is not the market for castor cake as manure sufficient at present?—A. No, I understand it is not sufficient to induce a much larger manufacture of castor oil.

Q. Or the growth of the castor? You think more castor might be grown?—A. Yes. If the value of the castor cake were increased, more castor would no doubt be grown.

Q. In Bihar and the United Provinces, manuring with cake is almost *nil*, and might be done to great advantage considering that there is at least a million acres of cane waiting for somebody to manure them with cake. Don't you think that an equally promising line of action would be in getting these people to use castor cake?—A. Because of the price?

Q. Other cakes are used very often as manure for cane which have also a feeding value. You think that castor cake would be prejudiced. Don't you think that the demand has so enormously increased as to encourage the production simply as manure?—A. No, the point was that it was necessary to increase the price very considerably.

Q. If you increase the price you would lose your existing cane demand which is very considerable in the south and west of India?—A. Yes, you would lose the cane manure and acquire a food instead.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. You say that some of the banks have got capital which they invest in capital expenditure; can you give any instance of this?—A. Banks like the Allahabad Bank and the Alliance Bank lend money against capital expenditure.

Q. Don't you think that Government should directly or indirectly help in starting such a big bank to help industries?—A. What I would like to see is a combined industrial and co-operative societies bank in each province. The present co-operative scheme provides for the federation of groups of societies into central banks, and a further stage in co-operative development is the federation of the central banks into a provincial co-operative bank.

Q. What help should the Government give to such banks? Should they guarantee interest on debentures or something like that?—A. No, if the Government give loans to industries, perhaps a good method would be to deposit the money with the industrial banks. Let the bank give the loan to the industrial concern and charge a small commission for looking after it.

Q. Then about the industrial banks, should they be started without any Government help?—A. A combined industrial and co-operative bank would be started in the same way as they had been in other provinces. It does not require any special help from Government in the guaranteed dividends or funds.

Q. In Bombay we have a central co-operative bank and Government guarantees interest on the debentures?—A. I don't think that would be necessary in Bengal.

Q. Then about the functions of the Board; you say the Board ought to be executive and they must have certain funds at their disposal. Don't you think that Government will not have very much funds at their disposal always to allot to different centres for industries? If in a province the industry did not come up, that money would lie idle?—A. If you have an Imperial Department of Industries, that department would only allot funds to provinces that require them.

Q. Then about the commercial college. You are not in favour of a commercial college in Bengal at present?—A. I take it that a college of commerce is intended to prepare for a University degree. University degrees are so regarded in this country that we would have a considerable number of young men who would take the college course for the sake of the degree, and when they had obtained the degree they would consider themselves qualified to conduct any commercial undertaking. The possessors of degrees would be able to impose on

some of their countrymen, who would be misled into believing that the degree was equivalent to a certificate of competency, and would entrust graduates with the control of new enterprises, and when these failed industrialism would suffer.

Q. In the Bombay Presidency we have a college of commerce; do you know the curriculum?—A. I have seen something of it.

Q. Don't you think that when people in this part of the country would leave industrial colleges, they would be efficient to carry on industrial businesses?—A. Bengal is not Bombay. I don't think we have reached in Bengal a stage of industrial development in which a college of commerce would be of any use. At present it would be a positive hindrance. The Government Commercial Institute is doing just about what a college of commerce would do in the way of useful teaching. It has a two-year course with a similar curriculum to that of the college of commerce in Bombay.

Q. But we have got a University degree?—A. That is a stage beyond.

WITNESS No. 179.

Rai Bahadur
J. C. Ghose.

RAI BAHADUR JOGENDRA CHUNDER GHOSE, M.A., B.L., *Secretary of the Association for the Advancement of Scientific and Industrial Education of Indians, Calcutta.*

WRITTEN EVIDENCE.

I shall confine myself to three matters: first, industrial education; secondly, development of industries; and thirdly, raising of capital.

As regards the first, the present industrial schools train up only surveyors and sub-overseers for the Public Works Department and as such are useful. The Sibpur Civil Engineering College trains up overseers and civil engineers for the Public Works Department and, after the Oldham Commission's report, a certain number of mining engineers.

In 1906 when I was a member of the Bengal Council I submitted a scheme for a technological institute and thereupon His Honour Sir Andrew Fraser was pleased to appoint a strong committee (generally known as the Oldham Committee) of official and non-official gentlemen to make a report about industrial education and development of industries. Copies of the correspondence and the Government letter are annexed herewith. The official members at the outset set their face against higher technical training on the ground that industries should precede industrial education as otherwise the young men, who are trained, would be unemployed. A large number of Indians and Europeans are still of that opinion and are opposed to the methods of the Scientific and Industrial Association.

The Committee went on with its labours and decided that the Sibpur Civil Engineering College should afford facilities for scientific and technical subjects on a par with European Universities in mechanical, electrical, and mining engineering and in industrial chemistry. It was also agreed that B.Sc. degrees should be granted in those subjects. The report was adopted by the Government of Bengal and approved by the Government of India and the Secretary of State for India. The Secretary of State however as a tentative measure sanctioned only the industrial chemistry classes which were opened. A mining class for overseers was also opened. The chemistry class has not succeeded because a high standard of initial education was of necessity required but young men could not get any degrees which are so dear to the heart of a Bengali. The experiment has not thus been given a proper trial. Again as there are few industries, industrial education must in the beginning be at a great disadvantage and the Government should not be discouraged by the disappointing results. The Scientific and Industrial Association repeatedly approached the Government on the subject and were assured that the three classes approved should be opened. In the matter of higher technical education nothing more than carrying out the recommendations of the Oldham Committee is necessary for the present.

The committee also fully dealt with the lower standard of technical education and the apprenticeship system. I must, however, here mention one very serious matter. The artisan class of Bengal is disappearing. The carpenters, blacksmiths and electrical mistries are mostly Chinese, Punjabese or up-countrymen. The offices and courts now absorb the young men of the castes from which those artisans were formerly recruited. Education has brought about this result. Hindus who have taken to education more than the Mahomedans are at a greater disadvantage. The masons, tinmen, the khalasis, the serangs and engineers of the inland steamers are all Mahomedans. The trade is also slowly passing away from the hands of Bengali Hindus, who are all aspiring after judgeships, seats in the Executive Council or large lucrative practices at the Bar or after the fame of newspaper writers or political agitators. The Bengali Hindus are thus about to barter a jewel for broken glasses, as the Sanskrit saying goes. It is necessary for the Government to remedy this state of things. Education cannot be stopped. The remedy is universal education which will remove the lower status of the uneducated artisans, and make him the equal of his brother who

attends offices. The other remedy is that the Government should open technical institutions for carpenters, blacksmiths and electrical mistries and fitters and employ the young men trained there instead of employing Chinese and up-countrymen.

As regards higher technical training, the complaint against the Scientific and Industrial Association is that more young men are trained by it in foreign countries and in more industries than is necessary at present. The figures in the report which have been published in the newspapers are a complete answer to the charges of unemployment and nonefficiency of the young men so trained.

Bengal's great industries are the manufacture of jute and the milling of rice. Matches, sugar, paper and leather, among other industries, can be profitably started. From the report* of the Association sent herewith it will be found that the students of the Association are employed in about 38 industries. It will also be found that they have been instrumental in starting more than ten new industries as Bengal capital is shy and capitalists further have not yet got sufficient confidence in Indian experts and prefer German and American experts to them. An Indian London D. Sc. will find it difficult to get Rs. 300 a month and will have to serve under an ordinary American B. Sc., who will not come to India for less than Rs. 800 a month. The industrial experts are looked down upon by barristers, doctors, civil engineers and building contractors as an inferior class. Purely Indian managed factories have little banking facilities. These are some of the difficulties in the way of industries being successfully started under purely Indian management and with Indian experts. The exploitation of the resources of the country by German and American capitalists and experts does it good but I would prefer pure Indian, also asserting their fitness in the field of industry and in developing the industries of their own country.

Appendices to written evidence.

(1)

GENERAL DEPARTMENT.

BENGAL SECRETARIAT.

D. O. No. 114²

CALCUTTA,
The 6th March 1906.

DEAR SIR,

I am desired to forward for your information the accompanying copy of His Honour's note, dated the 5th instant, on the proposed Technical College for Bengal and to invite your particular attention to paragraphs 4 and 5. The other gentlemen concerned have been informed.

Yours faithfully,

Babu Jogendra Chunder Ghose.

PROPOSED TECHNICAL COLLEGE FOR BENGAL.

Babu Jogendra Chunder Ghose, Secretary to the "Association for the advancement of scientific and industrial education for Indians," forwarded to the Private Secretary with his letter of the 2nd instant, a "scheme for a Technical College for Bengal." He intimated that a deputation from the Association would wait on me to-day to place that scheme before me. Accordingly Maharaja Manindra Chandra Nandi, Raja Peary Mohun Mukerjee, C.S.I., Mr. D. M. Hamilton, Babu Narendra Nath Sen and Babu Jogendra Chunder Ghose came to see me to-day on the subject.

2. The desirability of encouraging and developing technical education in Bengal was admitted on all sides and seemed to require no special discussion. As to the scheme, it was at once admitted that there is hardly room for two technical or technological colleges in Bengal at the present time. It was considered more expedient for the present, to aim at the extension and development of the scope of the present Technical College. This is called the Sibpur Engineering College, but its scope is already somewhat beyond engineering; and its name might be altered to indicate its wider aim. Mechanical engineering, physics, mining, and electrical engineering, which form part of the proposed scheme, are all already taken up at this college. What is desirable is, therefore, not to start a second college in opposition to this, but to endeavour to enlarge the existing college to include as far as possible all that is wanted. The demand for a second college will come later.

3. There are two points which were raised by the deputation. The one is, whether instruction in industries should await the complete establishment of these industries in the

country. It seems to me that one can hardly say that this is so. Instruction in industries has to proceed *pari passu* with the introduction of these industries. The instruction ought not to be postponed to the introduction of the industries, nor the introduction of the industries to the instruction. The second point is how far artisan instruction ought to be given in connection with the college. The training of artisans is, in all industries, of importance. Whether the artisan school ought to be a part of the technological college is a question requiring consideration. The technological college will require practical classes which are of the artisan school type. But how far artisan training should be part of the college is the question. There may be an artisan school either as part of the college or in its neighbourhood, like a practising school beside a training college.

4. These questions were briefly referred to by the deputation. It was ultimately decided that, in the opinion of all, it would be more expedient not to aim at starting a new technical college but to aim at developing the existing college so as to include as far as possible all that seems to be required. I then proposed that a conference should be held between the five gentlemen who have met with me today along with the Maharaja Bahadur of Darbhanga and the Nawab Bahadur of Dacca on the one part and the Principal and certain members of the staff of the Sibpur college on the other. Mr. Oldham, Director of Agriculture and Industries, might preside at that conference. I shall be very glad if you will arrange it, inviting Mr. Heaton and one or two of his staff to be present. The conference should report to me.

5. Let a copy of this note be sent at once to Mr. Oldham and to Babu J. C. Ghose and Mr. Heaton. Mr. Oldham will kindly arrange for the conference. It should take place, if possible, this week as Mr. Hamilton leaves for England within a fortnight.

A. H. L. F[RASER],—5-3-06.

(2)

DIRECTOR OF PUBLIC INSTRUCTION, BENGAL.

D. O. No. D.-164.

CALCUTTA,
The 6th April 1907.

MY DEAR SIR,

The other day you were saying to me that mechanical engineering had not been properly developed at the Sibpur Engineering College. On referring to the results of Mr. Oldham's conference of last year I find that it is definitely stated that the mining, mechanical, and electrical engineering training at the college is at present confined to lower classes but that under the new scheme now before the Senate graduate courses will be added and that the rules of the college will be framed so as to admit all students to the courses, irrespective of age, provided that they have had a sufficient general education to enable them to benefit by the instruction without proving a drag on the classes. It was further stated that these classes would, as far as the conditions of this country admit, be on a par with similar classes in Europe, I now write to inform you that steps are being taken to provide mining, mechanical, and electrical engineering training up to the standard required.

I am, Yours Sincerely,
E. A. EARLE.

The Hon'ble Jogendra Chunder Ghose.

ORAL EVIDENCE, 10TH JANUARY 1917.

President.—Q. You appear to misquote Sir Andrew Fraser in your written evidence. You state that "Sir Andrew Fraser decided that it is advisable that industrial education should precede industries"?—A. That is how I understood it.

Q. This is what he says, "Instruction in industries has to proceed *pari passu* with the introduction of these industries. The instruction ought not to be postponed to the introduction of the industries, nor the introduction of the industries to the instruction." There is no statement there that it should precede?—A. That it should not follow.

Q. It does not mean that it should precede. You have definitely stated there that he said that it should precede. What he really said was that it should not be postponed. That is an entirely different matter?—A. I understand it in that light because that was the issue.

Hon'ble Pandit M. M. Malaviya.—Q. What amount of money has your Association spent hitherto in sending out students for education abroad?—A. The amount of money that was received was four lakhs.

Q. From the time it was started in 1906?—A. Yes. The amount spent on the boys was about 15 lakhs.

Q. Four lakhs is the amount which you have collected from the public *plus* what you have received from the Government?—A. Mostly from the public.

Q. Do you receive also a grant from Government?—A. Yes, for the last six years. It was Rs. 5,000 before and since the war it has been Rs. 2,500.

Q. Is any condition attached to that grant or is it left entirely to your discretion to spend it as you think best?—A. It is left to the discretion of the committee to spend the amount as it thinks best, but we have to send in a list of our students for the approval of Government.

Q. Since the time when you began to receive Government grant?—A. Yes.

Q. You say that 15 lakhs has been spent altogether on the students. Was the balance derived from private sources?—A. Yes. All from private sources.

Q. How many students have you sent out up to this time?—A. More than 300.

Q. You say 140 students have returned. Is that figure brought up to date?—A. Yes.

Q. And you say that 130 of them are employed?—A. Yes.

Q. It is only ten who are not employed? Are these among the latest arrivals?—A. Some of them earlier ones too.

Q. You say in page 5 of your report that your students have started 20 new factories and are in charge of several factories employing a capital of over forty lakhs of rupees. Did these students who are in charge of these new factories receive education in foreign countries with the help of your Association's funds?—A. All.

Q. What positions are these students holding in these 20 factories?—A. They are either managers or principal experts.

Q. How do you select your students? I suppose you insist upon a certain standard of preliminary education here?—A. Our standard is this, that they must have either passed the Intermediate examination in Science or have undergone a three years' course in the Sibpur Apprentice Department, or two years in the Engineering Department, before they are eligible to any of these scholarships.

Q. Do you keep a watch over their progress there? Do you receive any reports?—A. We receive reports. The constituted guardian of our boys were the Y. M. C. A. in the countries to which they were sent.

Q. Even in Japan?—A. Yes, but as a matter of fact, very little control is exercised.

Q. You are not satisfied with the amount of supervision which is exercised over them?—A. No. It was not possible even in the case of my own sons who went up for the Bar.

Q. You have to leave the students very much to look after themselves?—A. Yes.

Q. You have got it as one of your objects, to make an advance or render other help, when necessary, to properly qualified Indian experts returning home from foreign countries to enable them to start industries or to impart instruction in them. Have you rendered any such help to any of your students? Has there been any occasion for it?—A. There has been occasion for it. From the funds of the Association we have not been able to render any help. We also have to raise capital for starting industries.

Q. As individual members of the Association?—A. Under the patronage of the Association. Furthermore, we have got promises in writing from the Maharajah of Darbhanga that he would invest ten lakhs of rupees for the starting of industries, and from the Hon'ble Kumar Arun Chunder Singh that he would pay Rs. 50,000 a year for ten years for starting industries in which our students would be employed.

Q. Has this been done?—A. Not yet. We have recently received a promise from the Maharajah of Kasimbazar that he would pay Rs. 50,000 a year for ten years provided we get another Rs. 50,000 a year.

Q. Will he pay it as a gift or as an investment?—A. As an investment on industries in which our students should be employed, and I hope that all these promises will be carried out in a short time.

Q. You say in clause (c) of the report it is one of your objects "To enable distinguished graduates of the Indian Universities to prosecute further studies in science in Europe, America, Japan or other foreign countries." How many of the 300 students whom you have sent out were graduates?—A. Most of these scholars were graduates. We have got three systems, those that get scholarship, those that get passage money and those that go under our guardianship.

Q. How many of these 300 were distinguished graduates of Indian Universities who went up to prosecute further studies abroad?—A. Not less than fifty.

Q. And these gentlemen have found employment in technical and scientific pursuits after returning from abroad?—A. Yes.

Q. Can you give me any idea of what their average income is?—A. The highest that they have got up to this time is Rs. 800 and the lowest is Rs. 100.

Q. You mention at page 4 of your report, three persons who have obtained the D. Sc. degree of the London University. Are these gentlemen employed now?—A. Dr. Biman Behari Dey has got an appointment in the Presidency College. Dr. Hemendra Nath Sen

is employed in Messrs. Tata and Company at Sakchi. Dr. Brojendra Nath Ghosh has not yet got employment. The other two are getting fairly good salaries.

Q. Have you any idea of the salaries?—A. I heard that it was above Rs. 500, but I am not sure about it.

Q. I have heard a complaint and I want to clear the matter. It is said that the selection of the students has not always been fortunate, that they were not selected with sufficient care to ensure their turning out successful students. Do you think there is any justification for this view?—A. No.

Q. You are satisfied that your system of selection is good?—A. It cannot be anything else than what it has been.

Q. You do not think you can improve it?—A. We cannot improve it. As regards the selection committee, it is always unanimous and we have got in the committee Mr. Gourlay, Mr. Hornell, Mr. Everett. We are always unanimous.

Q. Who are the members of the committee besides these three men?—A. Some of the best men of the country. We have got a regular committee to select students. We get a very large number of applications about 300. A dissent in the matter of selection has very seldom happened. The selection has always been unanimous.

Q. You have no system of keeping up correspondence regarding the students with the institutions where they are being instructed?—A. No.

Q. You mention in your note that the report of the Oldham Committee was adopted by the Government of Bengal and approved of by the Government of India and the Secretary of State. Has this been given effect to?—I have said about that in the note.

Q. You only say that the Secretary of State sanctioned the opening of industrial chemistry classes. Has anything been done beyond that?—A. I have repeatedly complained that it has not been given effect to.

Q. You say in your note, "The industrial experts are looked down upon by barristers, doctors, civil engineers and building contractors as an inferior class." Is that still the feeling, or is it changing?—A. It has not changed and it would not change for a long time.

Q. You say, "Purely Indian managed factories have little banking facilities." Have you any suggestion to make to us as to how these facilities should be increased?—A. I have been thinking over that matter for a long time. We have already been reading the evidence of several gentlemen before this Commission and they have made suggestions as to how Government could help.

Q. Have you any definite suggestion to make?—A. All those suggestions are before you. How far they are practicable is a matter for consideration by the Commission.

WITNESS No. 180.

Sir H. A.
Farrington.

SIR H. A. FARRINGTON, BART., *Officiating Conservator of Forests, Bengal.*

WRITTEN EVIDENCE.

Pioneer factories.

Q. 7.—I have no personal knowledge, but the Forest Department have turpentine factories in the United Provinces and Punjab which are, I believe, working at a good profit. I can make no suggestions as regards pioneer factories in Bengal to be started by Government.

There are large quantities of savannah grasses in the Duars Forests, supplies of which have been taken from time to time by the Calcutta firms for experiments in regard to paper manufacture but as the matter has always been dropped, as far as I am aware, these appear to be unsuitable for the purpose indicated.

As soon as the war is over, Calcutta firms, who have the first refusal of large concessions for bamboos and timbers, intend to start work on pulp for paper manufacture, a new industry in Bengal.

Financing agencies.

Q. 9.—A good proportion of the timber trade is in the hands of Indians, being carried on by small men working on borrowed capital, interest paid being about 24 per cent per annum as a minimum.

The only remedy appears to be a co-operative society and co-operative working and disposal, but I am advised that it is doubtful if such co-operation would be of long duration with the class of men concerned so that it is probable that, as heretofore, the "Mahajan" will continue to make most of the profit.

Research abroad.

Q. 22.—Provision for special chemical research work in England may be desirable; in that case it would not be necessary for the Indian Government to bring out to India experts of the highest reputation from whom the best results would be obtainable, after the preliminary work had been put through in India—in the case of the Forest Department, at the Forest Research Institute.

Industrial surveys.

Q. 25.—The Forest Research Institute is, I believe, doing all that can be done as regards the development of Forest resources.

Q. 30.—I have no personal experience but have heard that about 20 years ago an attempt was made to start a sale agency for Forest produce in Calcutta which failed. Sales agencies.

I may point out that one firm held the agency for the sale of Padouk timber from the Andamans for many years, I understand such agency or monopoly has not been considered altogether advantageous to Government and has been put a stop to recently.

The best method of disposal of any saleable product is to dispose of it to as many persons as possible and so widen the area of distribution, even at low rates of sale at first.

Q. 34.—In Bengal we have at present no timber which is exported to Europe in sufficient quantity to keep up a regular supply and there appears to be no scope for a trade representative. In a short time it is possible that provincial Governments will have their own Forest Economists when any possible developments in this direction will no doubt be investigated. Trade representa-
tives.

Q. 40.—Raw materials should be supplied from the Forests on favourable terms, and as a matter of fact, are disposed of on such very low royalties that any industry should be able to afford them. The royalty is generally a small item on the total cost of any product, e.g., 1 anna per cubic foot for Simul timber for tea boxes is charged in Assam. Supply of Govern-
ment owned raw
materials.

Q. 74.—To avoid overlapping of research work is desirable and this can be effected by exchange of literature between the different research institutes, who would only send out to other institutes papers likely to be of practical help to them; this would avoid extra expenditure on printing and circulation of matter useless to others. Co-ordination of
research.

Q. 87.—The leading Calcutta firms have, I believe, obtained much information from the Forest Economist's monographs to which they frequently refer. Special instances are wood for bobbins and for match boxes. Government publi-
cations.

Q. 101.—As regards the Bengal Forests, the question of freights is of little importance, simply because we have no timber at present in sufficient quantity to keep up a regular export business and little if any timber is so exported as far as is known. It is, however, believed that freights were prohibitive before the war—whereas tropical Africa and America compete against India as regards hardwoods and have no Suez Canal charges to pay and lower freights generally prevail. No remedy can be suggested. Shipping freights.

Q. 102.—It is believed that hydro-electric power has been fully investigated by the Calcutta Municipality and by a large Calcutta firm and may eventually lead to considerable development in the working of the Forests in the hills and the Terai or Doars below the hills. Hydro-electric power
surveys.

Q. 105.—The following are among the few Forest industries possible in Bengal:— Forest department.

1. Match making.
2. Paper pulp from bamboos.
3. Wood for boxes, jute bobbins.
4. Destructive distillation of wood for charcoal and bye-products and cutch manufacture.

Nos. 1 and 3.—Sufficient trees of the right kind are seldom found in one locality and this means greatly increased expenditure in extraction. The Forests are far from Calcutta. It is not yet known if our timbers will make ply wood or bobbins. Experiments with bobbin wood are being made by a Calcutta firm.

No. 2.—A Calcutta firm have this project in hand and if any one can make it a success they will do so.

No. 4 has been taken in hand by the Forest Research Institute. The question of cutch manufacture in Bengal might well be investigated in the near future.

Q. 106.—There are various possibilities for reducing the cost of assembling raw forest products, such as wire ropeways, hauling engines, and tramway development, all of which will require investigation by an expert before it can be definitely said that they are practicable.

A central factory would be desirable, for example, for the tea box industry and this would be a great difficulty.

Qs. 107 & 108.—These two questions may be taken together, Simul in the plains and Cryptomeria in the hills suggest themselves as example of forest crops which might be concentrated in one locality. The raising of an exploitable crop would take perhaps from 30 to 40 years.

The application of the uniform method to sal in the Doars and Terai will ensue in the near future and this will facilitate both extraction to depôt and transport to a railway. Hauling engines and tram lines could be employed to great advantage in these concentrated fellings.

NOTE.—Witness did not give oral evidence.

WITNESS No. 181.

PROF. C. J. HAMILTON, M.A., Minto Professor of Economics, Calcutta University.

(The written and oral evidence of this witness is confidential.)

Prof. C. J.
Hamilton.

WITNESS No. 182.

HON'BLE MR. M. S. DAS, C.I.E., M.A., B.L., *Lawyer and Merchant, Cuttack.*

WRITTEN EVIDENCE.

- Q. 1.—2nd part. People don't believe in success.
Q. 2.—Loan from money lenders and friends.
Q. 3.—No.
Q. 4.—None yet.
Q. 5.—(4) Desirable on certain conditions.
 (5) Desirable in the case covered by Q. 8.
 (6) Desirable under certain conditions.
 (7) Desirable.
Q. 6.—In all cases where Government pays money (oral examination).
Q. 8.—1st part. When an industry requires large capital and Government is consumer on a large scale.
 2nd part. When the business is well established.
 3rd part. This should never be done.
Q. 12.—All branches of industry which now constitute India's handicraft.
Q. 13.—(Oral evidence.)
Q. 14.—(Oral evidence.)
Q. 17.—Free or payment according to the financial position of the firm.
Q. 18.—Don't understand experts making researches. (Government does not allow.)
Q. 20.—Preparation of hides in Government estates.
Q. 22.—Necessary in certain cases to be explained in oral evidence if branches are correlated.
Q. 25.—Yes.
Q. 26.—1st part. Local knowledge should be a factor.
 2nd part. Utilize waste products.
Q. 27.—(Oral examination.)
Q. 28.—Not of much use.
Q. 30.—1st part. Very necessary.
 2nd part. Local influence and Government aid.
Q. 32.—1st part. Yes, to encourage and reward.
 2nd part. Raise the social status of the artizan.
Q. 33.—2nd part. If they are popular the other result will follow.
Q. 34.—1st part. Yes.
 2nd part. Business men.
 3rd part. (Oral evidence.)
Q. 36.—1st part. Yes.
Q. 37.—Do both.
Q. 38.—1st part. Division of patronage.
Q. 41.—1st part. Yes (oral evidence.)
Q. 44.—Very little has been done by Government.
Q. 45.—(a) Primary education to cultivate powers of observation and manual dexterity.
 (b) To induce literate men to work as labourers and raise supervisors from labourers.
Q. 46.—Have some experience.
Q. 47.—Had no opportunity of knowing the advantages but great disappointment from men educated in Europe and America.
Q. 48.—They should go together.
Q. 49.—I have some experience of night schools for full-time employes on same lines as other schools are developed.
Q. 50.—1st part. The latter.
 2nd part. Unison should be avoided.
Q. 51.—Supervisors should be men who commenced at the bottom of the ladder.
Q. 52.—(Oral evidence.)

- Q. 57.—2nd part. Yes, if of the right type.
3rd part. (Oral evidence.)
4th part. Both.
- Q. 59.—Both official and unofficial men of experience and sympathy.
- Q. 60.—1st part. Yes.
2nd part. The first.
- Q. 61.—(Oral evidence.)
- Q. 86.—Illustrated leaflets in easy language to be compiled in consultation with workmen.
- Q. 98.—1st part. Yes.
2nd part. Railways through the Garjats.
- Q. 102.—1st part. Nothing.
2nd part. Yes.
- Q. 104.—(Oral examination.)
- Q. 105.—2nd part. More power to local authorities.
- Q. 106.—(Oral examination.)
- Q. 107.—This can be done.
- Q. 109.—Prisoners who are skilled in any industry should be allowed to be employed in neighbouring schools of industry on terms to be fixed by Government rules.
- Q. 111.—(Oral examination.)
- Q. 112.—(Oral examination.)

ORAL EVIDENCE, 16TH JANUARY 1917.

Mr. C. E. Low.—Q. Will you state what your tannery at Cuttack is turning out at present?—A. Just now it is turning out the things that are required in the bazars and I have got some orders from Government for hospital slippers which I am turning out.

Q. What method of tanning do you adopt?—A. Chrome tanning as well as bark tanning.

Q. Is it worked by machinery or by hand?—A. By power machinery.

Q. What is your turn-out in the year?—A. It is not equal to the capacity of the factory, the machinery and other equipments. It is my own property and I lost a good deal of money in the experimental stage. For want of funds I cannot use the factory to its full capacity.

Q. Where do you get your materials from?—A. For vegetable tanning I get the materials in Orissa locally and I am using one of two things which nobody else uses. I found by experiment that we could make use of them.

Q. Had you any difficulty as regards the supply of tanning materials? Are they easy to get?—A. No. You cannot easily get them because the people are not accustomed to the wants of the industry, there being no industry. When there is an industry people fall into the way of getting things and there is a market. I had great difficulty in getting the people to collect the bark and bring it to me, but that of course is natural in every industry which is new, and I am getting over the difficulties gradually.

Q. You mean to say that there is plenty of the articles in question but that the supply has not been organised and that a larger demand would help to make things better and would make for a more organised system of supply?—A. Yes.

Q. Do you use tanning extracts?—A. No.

Q. It has been put before us in the course of evidence that the most effective way of breaking the monopoly of the German export trade in hides would be to tan the hides locally. To what extent do you think this can be done?—A. If it were done here we could not utilise all the hides here unless there is some improvement made in the tanning. In Germany they use these hides for many purposes, whereas tanneries here have hitherto been confined to foot-wear and some to harness. There is not the same demand, the same variety of demand in India as yet as there is in Germany. In Germany there is the Army demand and so many other demands.

Q. There they use up every part of every kind of leather for some purpose or other?—A. Even the worst hides that would be thrown away here are used there to some purpose or other. The trade is in the hands of big German firms who buy all qualities of hides and they mix them all together and then they are sent. The result is that the purchaser buys them and he loses so much per cent. But it does not affect them. But if the hides from all parts of the country are to be used here there must be some arrangement for collecting them together and distributing them to different branches of leather industry, and that must be undertaken by some big firms so that the loss may not be perceptible.

Q. Which hides do you use—fresh hides or cured hides or arsenicated hides?—A. I use fresh hides. Arsenicated hides are not to be found in this part of the country.

Q. Have you tried salted hides?—A. We use them.

Q. Could you make good leather out of them?—A. Yes.

Q. Is it much more difficult to tan these cured hides than fresh hides? A. Fresh hides from the slaughter houses give better quality, better feel. As regards the sun dried hides one has to take great risk because as soon as you put them in lime sometimes three-fourths of the hides is lost.

Q. Do you suppose the same is the condition in Germany?—A. The same hides go to Germany and the same is the result.

Q. On what do you base that opinion?—A. I have seen tanning in Germany, in England and in France.

Q. Did you find any difficulty in getting access to the German tanneries?—A. I found difficulty but I went in company with a German Sanskrit scholar who took me to one tannery. That was of course long before the war, some time in 1908. As you have been questioning me about Germany I may tell you one thing. That is this. I got hold of some lizards, something like iguanas which are found in Orissa and had them skinned. I had in my service a German tanner and I had also one Austrian and they communicated with me for buying these things and from the correspondence I understood that they were corresponding with the German Government for buying these. They wanted to make gloves.

Q. Have you had any difficulty in financing your tannery. You want money to buy considerable quantities of hides? Have you applied to any of the ordinary banks for financial assistance?—A. I applied through a friend of mine to one of the Indian banks and the interest they charged came to something like 31 per cent.

Q. You have not applied to any of the Presidency Banks or the exchange banks?—A. No.

Q. Have you any local banks in Orissa?—A. No. But I have my account with a bank and they would not allow me to overdraw even by one pice.

Q. What bank is it?—A. The Delhi and London Bank.

Q. Where is their branch of which you speak?—A. In Calcutta.

Q. They would not advance anything on the security of the hides or the leather in your tannery?—A. They would not give anything even on the tannery itself.

Hon'ble Sir R. N. Mookerjee.—Q. Is it a bank that you mentioned as charging 31 per cent. or is it only a Marwari?—A. It is a bank. If you want to know the name I can give it confidentially. There is one point which I would like to mention to the Commission. One difficulty that I feel is this. Now the money lenders are mostly Hindus in a large part of the country. They would not advance anything to any one in the hide trade. Consequently the Marwari has to borrow it from the Hindu and then he lends it.

Q. Have you any suggestions for remedying this state of things?—A. My suggestion is this. If a factory has been successful and the articles turned out by it have a good demand, and if the things can be sold any day, and if it cannot work up to its full capacity because of the want of funds my suggestion is that Government ought to help it at a very low rate of interest on the security of the property.

Q. We naturally contemplate a considerable expansion of industrial enterprise and it is obvious that the Government cannot go on doing this beyond a certain point. They have neither the funds nor the machinery. Can you suggest any means that would be automatic and would go on expanding, advancing money on ordinary commercial terms?—A. Government might give the money to a bank and authorise the bank to issue the money at a low rate of interest.

Q. What do you think is standing in the way of these people advancing the money. They do not refuse to pay out of sheer iniquity?—A. No. I do not attribute any malice or anything of that kind. The thing is that of late there have so many failures in industrial enterprises and the banks does not naturally like to risk the money and go to litigation and all that sort of thing.

Q. Is there any way in which Government might help the bank to ascertain whether a business which it is going to finance is good business or do you think that Government help is not required?—A. I think Government ought to come in.

Q. You don't believe in spoon feeding. That cannot go beyond a certain stage?—A. My point is that if the Government helps for a short time then the industry ought to be able to stand on its own legs.

Q. One difficulty would be that the bank may take all the good business and leave the unsafe to Government?—A. I suggested that Government need not engage themselves in the thing directly but that they may authorise the bank to satisfy themselves and then consult the Government as to whether any particular proposition is satisfactory. The bank can easily ascertain what things are there to serve as security, what they will be worth and so on, and then advance the money.

Q. The difficulty seems to arise from the fact that in the first place the bank seems to be unwilling to take to any new line of business and secondly they have not got the mechanism for ascertaining the value of the stocks and whether the business is being conducted in a way which would make it likely that the money would be repaid?—A. There is an easy way of solving that difficulty. For instance small sums repayable in three or four months may be advanced which would be far below the value of the property and as soon as the business can repay the money from their sales they would repay the money. So there will always be a

current account. They will take the money and they will return the money and they will again take fresh money.

Q. In your answer to question 47 you say that you had great disappointment from men educated in Europe and America. It is an interesting point. We have seen one Indian who seems to have got satisfactory education in tanning in England and in Europe and he is now managing a tannery himself with some success. Presumably there are a certain number of failures but from what you say it appears that the men whom you have met have all been failures?—*A.* They were failures in the sense that they had enough scientific knowledge but that they could not apply it to the conditions on the spot. I fully endorse the opinion given by Dr. Proctor before the Morrison Committee. He says that they are very good in the laboratory and in the lecture room but that they are quite unsuited to commercial purposes. That is to say they can never adapt their experience to the altered circumstances here. For instance I shall tell the Commission what happened yesterday. I told my man to do a certain thing. He came back and said that he had told another man to do it and that this man said he could not do it. I told him that the man would naturally like to idle away his time and then I went and showed how to do the thing. The thing is they cannot do the things themselves.

Q. Is it not the case that most of these young fellows who go over to foreign countries do not get shop experience there?—*A.* Exactly so. Very often it is not their fault but with the system of education given. For example in a tannery one has to deal with hundreds of hides. It is not possible to ascertain by chemical test whether each one has attained a desired stage. A man's eyes and hand ought to be trained to do this.

Q. So you think that if they had shop experience that would improve these young men?—*A.* Certainly.

Q. Do you think that getting into shops could be made easier. There seems to be some difficulty at present?—*A.* I cannot say as to getting into the shops. I have no personal knowledge of the subject. I think that in all industries people must begin at the bottom and work their way up.

Q. Don't you think that the best way to get over that difficulty is to have shops in this country?—*A.* No doubt that will help.

Q. Do you think it would be a good thing if these young men who came from foreign countries were made to serve for some time after their return in some Indian factory?—*A.* I cannot agree with you there. My idea is this. My experience has led me to believe that the hand and the eye should be trained simultaneously with the acquisition of scientific knowledge. If you get the head only stuffed with scientific knowledge then the result is that the man would not work with his hands. They should begin as apprentices here. The brain must be assisted by the eye and the hand. If the brain is stocked with scientific knowledge the man becomes a mere ghost and a ghost is only mischievous. I fully endorse what Dr. Proctor said. He said 'Don't send a man to learn the leather industry unless he has the leather in him.' In one case a man was successful and that was because he was the son of a mochi.

Hon'ble Sir R. N. Mookerjee.—*Q.* Have you observed this only in the leather industry?—*A.* These observations refer to every kind of industry. If the training of the hand and the eye is so important in ordinary education it should be much more so in industrial education.

Q. In answer to question 52 you say that you would give your opinions orally?—*A.* When I took up this leather industry I made many mistakes and I lost a good deal of money. I asked Government to give me access to the Harness Factory at Cawnpore and they did not want to show to others the method of their work. I had then to approach the Bengal Government. Even Government factories are jealous of showing what they are doing.

President.—*Q.* Whom did you get that answer from?—*A.* That was long ago. It was some Major. I forget the name and then I spoke privately to Sir Andrew Fraser.

Q. He is the Superintendent of the factory. Is that what he actually wrote?—*A.* They do not allow. I have got the letter.

Mr. C. E. Low.—*Q.* With reference to your reply to question 57 what should be the functions of the Board of Industries?—*A.* They must be not only advisory but also executive. They could have power to come to a decision in the matter of seeing whether a particular industry should be developed and they can take such measures as Government can take in the matter of the development and the growth of an industry.

Q. Do you think there should be a Board as well as a Director of Industries?—*A.* I should not at this stage answer that question. Unless the Board actually works it will not be possible to say.

Q. Supposing there were a number of experts, such as the glass expert and so on, whom would they take their orders from? Don't you think that there will be difficulty in having a multitude of executive officers?—*A.* I do not want a multitude of executive officers. They are not a blessing. What I say is that the Board might come to a decision in certain things and then the executive might rest with the President or the Board or somebody else.

President.—*Q.* If you have a Board of Industries and a Director of Industries the Director of Industries will be responsible for the executive work only?—*A.* There must be one person to do that.

Q. The question now comes to this. Somebody must be responsible not only to give the order but also to see that the order is carried out. You cannot have an honorary man doing that?—A. No.

Q. Now what Mr. Low wants to know is whether this Board should have power to give executive orders to the Director or whether the Board should only give advice which the Director may or may not accept?—A. I cannot answer unless a thing like that actually works. It is very difficult to say how far their advice will be binding or not. If it is binding in every case then the Director simply becomes a person in a subordinate position. That of course he should not be. If every decision is binding then what is the good of having a Director. I think the Director might be a man with local experience.

Q. If the Director frequently went against the advice of the Board the Local Government would ask the Director his reasons for passing over the decisions of the Board?—A. That the Local Government ought to. I cannot say what the relation between the Director and the Local Government will be.

Q. The Director will be an official appointed by the Local Government and he therefore must be under their orders. We are not proposing to supersede the Local Government?—A. If the Director has been regularly discarding the opinion of the Board it ought to be open to the Local Government to ask the Director his reasons for his action.

Q. Do you think that the Board of Industries should have executive power?—A. You cannot trust the executive power to a number of people. It must rest with one of the members of the Board or somebody outside it.

Q. You would not object for instance to the proposal that there should be a Director of Industries with executive power and with him associated a Board which has advisory powers?—A. No. If the executive power was to rest with the Board it must rest with somebody in the Board. It must rest with one person and not with a number of persons. I think that can be done. There need not be any fear in such an arrangement.

Mr. C. E. Low.—Q. What have you to say in regard to question 106?—A. The difficulty is about communications among forest produce, I include also the hides. In the Garjats for instance. I am talking of Orissa only. There are Government estates where they sell not only the animals that die but also animals belonging to the ryots and Government gets as much as Rs 12,000 and Rs 15,000 for selling. They call it by a different name. Really Government takes the money and I have very strong feelings on the subject.

Q. Would the peasant take it away if he were allowed to?—A. He would not take it on religious grounds.

Q. In what way does the auctioning by Government result in any deterioration of the hide?—A. Because Government does not do anything to preserve the hide. The hide ought to be skinned and then it should be salted. If Government were to take up that work then other people will do it.

Q. Do you find that any difficulty which you experience in getting forest products arises from any deficiency in the Government system for collecting raw forest products?—A. There is difficulty. It would be more convenient to people if they were allowed plots of the forests for the taking of the bark. If they auction the whole forest nobody will buy.

Q. At present Government sells by the compartment system or the coupe system by which the auction purchaser removes things. Do you get the tanning materials from the auction purchaser?—A. I do not collect my materials from the Government estates. I find that they are quite unwieldy and difficult to work.

Hon'ble Pandit M. M. Malaviya.—Q. When did you start this tanning business?—A. This tannery I started about 12 years ago. There was a tannery previous to that.

Q. When did you start the first one?—A. It was an experimental one and I started it some 17 or 18 years ago.

Q. Is that the only industry in which you have been engaged?—A. I have dabbled in the gold and the silver industry also, and I have also done some work in connection with the utilisation of the waste products.

Q. Wasted in what industry?—A. Take for instance the horn industry. The horns were used for combs. The tops of the horns are too thin. I found that they were wasted. I got some men to take it up and turn it to account. When they learnt it and got a market for their goods I advanced some money and had it worked out.

Q. Who is the manager of your factory?—A. Myself.

Q. Is the tanning work done under your orders?—A. Everything is done under my distinct orders.

Q. Who supervises the thing?—A. I supervise.

Q. Have you given up practice?—A. No. In the beginning I had to attend to it too often but now my workmen are trained and they are able to understand my instructions. In the beginning I had a German manager, and then an Austrian manager, and after that several Indian managers. Now my workmen are trained. I have still a manager—Mr. Dutt.

Q. Has he had any special technical education?—A. He was educated in America in the leather industry.

Q. How long has he been with you?—A. Two years.

Q. How long did he receive his education in America?—A. For three years.

Q. Before he went to America what sort of education did he have. Is he a graduate?—A. I do not know whether he has got a University degree or not. My manager works under my orders, and consequently I do not expect much responsibility from him.

Q. Has he studied the chemistry of leather?—A. He understands the chemistry of course. My previous manager was a B.Sc. of the Calcutta University. Then he went to the Sibpur Engineering College. He went to Glasgow and Leeds but I found that he could not do much.

Q. You said that you had an Austrian manager. How long was he with you?—A. Three years.

Q. And the German?—A. A year and a half.

Q. What sort of education did these men have?—A. They were workmen. They could not adapt their education to suit the altered circumstances of this country.

Q. Did you find that in their case lack of scientific education was the cause of their failure?—A. Because they received their training in a foreign country.

Q. Is not the leather trade the same everywhere?—A. No. It is very different. People imagine that the leather trade is just like carpentry or blacksmithy. In the case of these two latter, nature supplies the materials. In the case of the leather industry, it is essentially a chemical industry. It all depends upon the bark, the climatic conditions, the water and so forth.

Q. Does your present manager who has returned from America possess the scientific knowledge necessary for your industry?—A. Not for my industry but for the leather industry in America.

Q. He does not possess the knowledge necessary to carry on your industry?—A. Not for Indian industry because the hides are so different. You don't get the English or the American hides here.

President.—Q. You apparently are of opinion that a boy who is sent abroad should, after he returns, receive a certain amount of practical sympathetic training in this country?—A. Yes.

Q. The present system is being condemned by some and upheld by others without considering that there is an intermediate course, namely of combining the theoretical training abroad with practical training in this country, and the difficulty seems to be to get these young men the practical training that is necessary under sympathetic supervision?—A. That is a great difficulty and I have myself lost a good deal of money in this tanning industry. I heard from some people that even in England the professors are averse to teaching the secrets of the industry. They give all the scientific teaching and when any one wants to know how a particular leather is made the professors say that it is not their business to teach that unless you pay them so much money. They would not give out the secrets of the processes.

Hon'ble Pandit M. M. Malaviya.—Q. Suppose there is a young man who has been to Germany, England and America, and suppose he has received practical training in addition to his scientific training, would not that training enable him to take up business here?—A. It has not been successful in practice.

Q. You are aware that before the war a lot of hides used to go to Germany from India?—A. Yes.

Q. Suppose an Indian went and received training in one of the factories where these Indian hides were cured, would not that experience stand him in good stead?—A. No. Up to a certain stage he can get on well. But if you say that he can produce leather he will fail there, when the question of the climatic conditions and the water and so on come in. The first part of the thing he will be able to do all right.

Q. Suppose a boy returns after receiving education in a foreign country and is then put into some tanning trade in this country in order that he may acquire the necessary local knowledge and experience, do you think he will be immensely better qualified to be a successful tanner than a boy who has not had the advantage of such education?—A. Yes.

Q. Do you admit apprentices to your tannery?—A. Yes.

Q. Have you any at present?—A. Not at present.

Q. How many have you had during the last 12 years?—A. About two or three only. They would not stick to the trade.

Q. Would you modify what you said about men becoming ghosts and all that in view of what you have now said. You do not suppose that anybody would recommend that only scientific education should be given unaccompanied by practical training?—A. I have told you what I feel, whether anybody recommends it or not.

Q. How many of these Europe-returned men have you come across who have studied the art of tanning?—A. I have seen about five in all. All those five worked under me.

Q. In what capacity?—A. As managers.

Q. Then you have had eight managers in addition to yourself?—A. Yes and I have lost three lakhs.

Q. Do you know who is the manager of Dr. Nilratan Sircar's factory? He has been regarded as a very successful student?—A. That may be so. I am glad to hear it. I do not say that all are failures.

Q. Do you agree that if there was a big tannery started by Government here where both scientific and practical training could be given, that would be the best way of preparing our young men for work in this line?—A. You cannot possibly imagine anything better.

Q. You think there is need for such a school?—A. Yes.

Q. You mean in Bengal?—A. I thought you had asked me for all India.

Q. Do you want one in Orissa?—A. In Orissa there is room for one.

Q. Do you know that a very large quantity of hides is exported from Calcutta?—A. I know that about ₹70,000 worth of hides comes to Calcutta every day for export.

Q. In view of that fact do you think that Calcutta is a suitable centre for a good school of tanning to be established by Government?—A. Yes.

Sir F. H. Stewart.—Q. Should it be a school or a factory?—A. It should be a combined institute.

Hon'ble Pandit M. M. Malaviya.—Q. You would not prefer that practical instruction should be given in the tannery and scientific education in a school apart from the tannery?—A. They should be combined, there should not be any disintegration of education.

Q. You say that the Government should help this industry by advancing money. Do you think that Government should advance money on easy terms?—A. I was not speaking of this tanning industry alone but of all industries. If Government finds that there is a market for the article and that the industry is suffering for want of funds then they should help that industry. My opinion extends to all industries and not merely to the tanning industry and if such an impression has been created by the wording of the sentence I should like to alter that.

Q. Do you think that a direct loan from Government on easy terms would be suitable or would it be better that Government should help some bank which should finance industry?—A. I really cannot say. From the borrower's point of view it would be preferable to get money which carries the cheaper rate of interest.

Q. Don't you think that if the Government gave the money to some bank and that bank advanced money after examination of the possibilities of the industry, it would be better?—A. That would be the businesslike way of doing the thing.

Q. One difficulty that has been advanced in this connection is that the banks at present do not have the machinery necessary to ascertain whether a particular industry is worth encouraging and whether it is a sound undertaking. Do you think that there will be any great difficulty in getting the necessary experts?—A. I cannot see that there will be any difficulty on that account.

Q. With regard to the executive power to be given to the Director of Industries your objection was that a number of persons cannot act as an executive body?—A. They cannot be armed with executive powers.

Q. Suppose the Board is constituted of a number of persons, say half a dozen, and they come to a decision on certain important matters, then their decisions can be given effect to by the Director as the executive of the Board. Suppose the Board passed a resolution that some light railway should be helped, then the carrying out of that resolution in whatever form Government may prescribe can be left to the Director. Would you leave that power with an individual or with the Board?—A. In that case if it is left to the Board there is no necessity of a Director of Industries. He becomes actually subordinate to the Board.

Q. He becomes the mouthpiece of the Board?—A. I understood that he was a person in a superior position. I understand from the way in which you have put it that the Director of Industries would be something like a Secretary to the Board of Industries.

Q. By whatever name you call him, he will give effect to the decisions of the Board. Suppose the question was whether a jute enterprise should be helped. Don't you think that it would be an advantage to have on the Board men who have done business in jute. Do you think that the Director should or should not listen to their advice? Should he be bound to act according to their advice or left to decide the matter for himself?—A. If you leave the final decision with the Board where is the necessity of having a Director. The Board can certainly have in that case a Secretary to carry out their decision. The Director of Industries becomes simply a hand of the Board. And then my second difficulty comes in regard to the working out of the details. When you work out details, I think it would be very difficult to leave the working out of the details in the hands of a single person.

Q. The Director of Industries will not be like the manager of a business firm who has to decide promptly whether he should or should not buy, say, 100 thousand bales of cotton. He will carry out a certain policy which will probably be laid down by the Board. He will help enterprises in their initial stages and advise about the purchase of machinery, etc., and publish information about a particular business. He does not require the power to decide promptly and at once what ought to be done in a particular business. Do you contemplate that the Director of Industries should have power to decide whether he should go into a particular business or not, or whether he should advise anybody in the way of purchasing materials?—

A. Hitherto I have been under the impression that it is the Board which will be in contact with the people and it would have the people's representatives, there and consequently their decision would be the popular wish or whatever it is. I understood from your questions that the Director will have to decide upon questions which came to him through the Board.

Q. In that case you agree that it will be largely questions of policy or questions of helping particular enterprises in their initial stages that will come to the Director and not details of particular transactions? Will it not be an advantage that the Director should be guided by the collective wisdom of the Board?—*A.* Then we come back to the whole question whether this Board will deal only with principles or take into consideration particular cases.

Q. In the case of a light railway for instance to Garjats, would you leave the recommendation to be made by the Director or would you leave the recommendation to be made by the Board of which the Director will be a member?—*A.* I understood that all recommendations come from the Board and that the Director will be the executive officer to carry them out. Then the only question which arises is whether he is bound to carry out the Board's orders in every case or not. He might be a man who might upset every action of the Board and throw their recommendations into the waste paper basket. I understand that he will be responsible and answerable to Government who will ask him his reasons for acting in an arbitrary manner.

Q. Do you think that ordinarily he should carry out the orders of the Board and that where he differed he should report the matter to Government?—*A.* That would be a satisfactory arrangement.

President.—*Q.* Would you allow the Board also to report to Government?—*A.* It will all depend upon what sort of a Board it was. Much will depend upon that.

Sir F. H. Stewart.—*Q.* Can you say how the land policy of Government has affected industries? What remedies can you suggest?—*A.* I shall take the abolition of the salt industry for instance. It is intimately connected with land policy. Now salt tax itself is a most unique taxation having no precedent in the world. The same difficulty arises with regard to the salt-petre now. There was a time, about 1804 or 1805 when a regulation was in force which said that the salt duty should be annexed to the revenue. Now you take the revenue from the man and still you say that he cannot use the land for salt manufacture. Since the salt industry was abolished people have been subject to famine every fourth or fifth year because they have nothing to fall back upon.

Q. What is your suggested remedy. Would you allow them to make salt under Government supervision?—*A.* They should be allowed to make salt because that would develop another industry, the fish industry. The fish lives in the water and when it is there it consumes any amount of salt and when it comes out you do not allow it to be preserved with salt.

Q. Are the people in Orissa willing to work in factories, tanneries and so on?—*A.* It takes one a very long time to get the necessary training.

Q. Do you attribute that to backwardness in education?—*A.* I attribute this to this cause, that you do not give the artisan the position he deserves. The artisan is looked down upon because manual work is considered degrading. I think the social position of the artisan should be raised. I have had a good deal of correspondence with Government on this matter. Government for instance would not recognise the artisan. Public bodies welcome a Lieutenant-Governor and present him a casket containing an address but the artisan who made the casket is not allowed to enter the premises. I know an artisan in my workshop. His son passed the entrance and preferred to be clerk and declined to follow his father's calling. He thought he would become a municipal commissioner some day and then he can shake hands with the Lieutenant-Governor. At present the artisan has no position in society.

Q. Is there any change for the better?—*A.* No, I think it is getting worse.

Q. Would you explain a little more clearly what you say about the railway for the Garjats?—*A.* The Garjats are the tributary states. There is any amount of mineral there, such as manganese, coal, etc. At present they are inaccessible simply because there is no railway.

Q. Would it not be desirable to see more about the resources of the place before you decide on the alignment of the railway?—*A.* Quite so.

President.—We had this matter brought before us by the Political Officer and one difficulty was that the mapping is imperfect and that is why the Geological Survey has not yet extended its operations in that area.

Hon'ble Sir Fazulbhoy Currimbhoy.—*Q.* Suppose that the boys are educated in the first instance in the theory and then they gain experience in the factory, would that meet your point?—*A.* I should prefer that the two educations should go together.

Q. Which is the more essential?—*A.* I cannot say. I get a man who is good at the scientific part and he fails in the manual part. My experience shows that the mechanical part needs more attention than the scientific part.

Q. Have you trained any man in your factory who will be able to do the things for himself?—*A.* I cannot say that they get all round training. We are only making some things for which we can find a market.

Q. You are a practical man then?—*A.* Whether I am a practical man or not I am a man and I can turn out things that can be sold. Before I go I should explain one thing to the Commission with regard to this leather business. Some time ago the Australian Government

Mr. K. Chowdhry. found that leather coming from India was poisoned. The trade in England went up to the Secretary of State also. These cases ought to be stopped. The Indian population in India is divided into two parts—the educated and the masses—and one turns its back to the other. The question is how the handicrafts should be encouraged. There is a market for the things. Artistic work can never be done in factories or machines and more men should be encouraged to take to it. With this view I have brought certain things made in Orissa to show what even backward Orissa can do in this matter, and if the Commission wants to see them I can show them.

President.—Q. I am afraid we cannot alter our programme?—A. No. I have brought the things here and shall not take more than 10 minutes. (Witness showed the things.)

WITNESS No. 183.

MR. K. CHOWDHRY, *Chilka Lodge, Puri, Orissa.*

WRITTEN EVIDENCE.

Financial aid.

With the exception of long established industries, such as, jute, tea, cotton, light railways and a few others, which have paid steady dividends for years, capital is naturally difficult to attract to new enterprises of unproved possibilities. These difficulties will be less as soon as public opinion is educated in favour of sound finance and new industrial propositions are submitted to and approved by technical and financial experts before inviting public subscriptions. The recent failures of a number of joint stock concerns have hit the middle class investors very hard but the time is not far when the landed aristocracy, particularly of Bengal, will open their purse strings for capitalising industries specially approved of and patronised by Government. The Companies Act which has recently come into operation has already had its desired effect on unscrupulous company promoters and the statistics show considerable falling off of the mushroom limited liability companies which were multiplying before 1913. I would suggest further amendment of the new Act to bring it to absolute uniformity with the English Act with regard to sections dealing with minimum subscriptions on which companies should be allowed to commence business and elections of auditors and filing of balance sheets. The relation of managing agents to the shareholders requires to be clearly defined and their present powers should be further limited by amendments of certain sections.

Government assistance, such as bounties, loans, and other practicable aids to deserving industrial enterprise are essential for a start but the problem of selecting particular industries and the amount of assistance to such is a very intricate one, as Government officers, unless very carefully recruited, are bad business men and their judgments are likely to be hampered by unhealthy influence. I would suggest the creation of an industrial bureau in each province in charge of an experienced officer assisted by the executive committee of select business men who must be well paid for their labour.

Pioneer factories.

I have no personal experience of Government pioneer factories but I have some experience of Government pioneering industries, e.g., fisheries, and I say unhesitatingly that this particular method though expensive and somewhat onerous is about the best to remove certain obstacles that stand in the way of establishing new industries in a country as proved by undertakings of the Governments of South Africa and Australasia.

The Government, however, must take the public into confidence in this matter and employ only the very best men available and the most up-to-date tools and plants in all pioneering work so that the fiasco such as the "Golden Crown" Deep Sea Fishing Experiment is not repeated. I had the good fortune to work with the very crew who manned this trawler in Hull after they returned home and have heard scathing criticism regarding the purchase of this pioneer craft in Hull effected by an officer deputed from the India Office. I am, however, abso utely convinced that the Bengal Government, when they undertook this work, was prompted by a sincere desire to help us to start an industry whose possibilities are untold and well-nigh incalculable. I do not approve of converting any pioneering experiments into permanent Government enterprises.

There should be more co-operative societies specially formed with Government aid and organised to finance cottage and rural industries and market produce of manufacture on advantageous terms. Trade guilds are all ancient institutions and served their purposes very well, and they still thrive and afford collective facilities to members of same trade, such as the Cloth sellers or Leather sellers Guild in the city of London. Their transplantation in this country will be perpetuating the evils of the caste system which stand conspicuously in the way of our social and industrial progress.

As for limiting Government assistance to industries care must be taken that such industries should not as far as avoidable compete with cottage industries. No new enterprise, particularly manufacture, will survive unless it can compete with an established external trade and to refuse aid to such enterprise because of such competition would practically be bidding good-bye to the efforts of this great Industrial Commission. This involves intricate problems of tariff and I am in favour of an Imperial preference and protection against purely foreign countries.

My personal knowledge of Government technical aid was in connection with fisheries and the present Deputy Director, Mr. Southwell, has been frequently consulted by me. Only the other day I sent him a sample of jelly fish which he carefully analysed and he determined the ingredients. Technical or scientific aid of this kind should be more popular and more easily accessible to the public than it is now. Technical aid.

The loan of Government experts, *e.g.*, Geologists, should frequently be made to private firms or companies on certain conditions, *e.g.*, experts should be allowed to make records of their work with such firms and those records should be available to *bond fide* business men.

Surveys of the available resources of the country require to be materially supplemented by fresh investigations from a purely industrial or commercial standpoint. The reports of the Forest or Geological Departments or at least most of them, appear to be more scientific and therefore incomplete without such information which attract capital or entrepreneurs. Compare them with the reports of Washington or Chicago bureaus published periodically for information of the mercantile public.

Commercial museums are no doubt very useful institutions but I would prefer travelling exhibitions to be held periodically under Government control at different centres and under a permanent Exhibition Committee. Its location in Calcutta does not seem to attract the same amount of attention of the purchasing public as it would if held in different districts or centres. Marketing products is as equally important as manufacture itself, and want of special and proper care in this respect has brought about more failure to makers of indigenous goods than want of perfection of the manufacture itself. Our trades and industries are not sufficiently developed yet to warrant the appointment of trade representatives outside India. It would however be useful if British Consulates in foreign countries can spare men to reply to Indian trade enquiries. As regards official patronage regarding purchase of stores there should be no secret publication of lists of manufacturers as is now done by the Director of Commercial Intelligence. Open and public enquiries should be made by competent men about the position and capacity of Indian manufacturers before their names are included in Government list. Assistance in marketing.

Banking facilities in marketing indigeneous products are absolutely essential. Many important industries under Indian management have failed because the banks would not advance a pice against hypothecation of products or plants and properties. I would suggest the creation of a department in Presidency Banks to deal with this matter and to have proper powers to advance money against goods, bills of lading, and assets. This is a supreme problem and requires definite solution and no half-hearted measure would be of any avail. The huge mills on the bank of the Hoogly or the Titanic tea plantations in Assam and elsewhere are monuments of not mere joint stock ventures under expert management but depend, every one of them, on advances made by the city banks on moderate interests. Banking facilities.

Indian entrepreneurs, most of whom are neither shareholders, nor directors of the exchange or joint stock banks, receive little or no facilities from these fountain sources of capital which feed finance and commerce in every progressive country of the world. The Government would do well to step in and see that the banks do co-operate with *bond fide* Indian manufacturers, exporters, importers and entrepreneurs.

The land policy of the Government requires considerable modification to cope with the industrial progress of the country. In its present form it gives no encouragement to entrepreneurs, as for instance not long ago I had protracted negotiations with the late Sub-Divisional Officer of Khurda in the District of Puri for a small parcel of land to build a fish curing yard and a depôt on the bank of Chilka and was, after four months of correspondence, referred to the Khasmahals Act which precludes grant of land excepting for purely agricultural purposes. Managers of Government estates and forests should, unless the law is amended, be specially instructed not only to grant lands on favourable terms for industrial purposes but give additional facilities which lie in their powers to further such purposes. Land policy.

Lack of primary education does to a certain extent hinder industrial progress and its acquisition materially helps artisans and workmen to learn efficiency and skill. In the fisheries industry, in which I have been engaged, very little has been done to improve the fishermen's efficiency and skill. Proprietors and managers of big industrial concerns should provide facilities for theoretical training of employes by holding occasional classes and demonstrations. If necessary, they should be given Government aid to encourage and continue such theoretical training for employes. In my own industry, *viz.*, fisheries, instructions may be given to fishermen to make and handle improved boats, nets, and gears, and, where there is dry or desicated fish industry, practical instructions in preserving and curing fish with or without salt should be very useful. Training of labour and supervision.

Apprenticeship is about the best system of training skilled hands for industries and my own experience is considerable in this respect. I was a premium pupil in a well-known engineering firm in Manchester subsequent to my completing a three years' engineering course at the Owens College, and as Secretary of the Manchester Indian Association it was part of my duty to help young Indians to enter manufacturing firms as ordinary or premium pupils. For those who aspire to be supervisors and managers, I found the sandwich system, as prevalent in Scotland and in a limited scale in Lancashire, *viz.*, schooling in winter and workshop training in summer brings about the best results. I am in favour of evening classes being started in some of our Government institutions in large industrial towns with

ordinary tools and equipment and fairly competent staff, instead of founding expensive technical schools as the City and Guilds of London, and the famous Manchester School of Technology which latter is run exactly on the lines of the world's best Technical Institution in Charlottenberg in Germany. Technical institutions, in my humble opinion, are not fore-runners of industry. They train pupils to run industries after they are well established and they help pupils to devise means to compete with foreign manufactures. Let us have small mechanics' institutes as they had in England and Scotland during early days of industrial activity, with evening classes for the benefit of industrial pupils.

State scholarships or stipends may be given to specially selected supervisors and managers to study conditions and methods of industries abroad and their conditions and terms should be different from what they are now.

Mechanical engineers.

There should be a Board of Examiners in each province to grant certificates of competency to duly qualified candidates as mechanical engineers and qualifications of candidates should be the same as that required for the Board of Trade examinations in England. No racial bar should stand in the way of candidates for any professional examinations. It is a matter of regret that Indians are not allowed to qualify as Boiler Examiners.

Official organisation.

I do not know of any official Department in this province for development of industries except perhaps the Fisheries Department which is amalgamated with Bengal and worked and controlled from Calcutta under a single Deputy Director whose establishment is partly paid for by the Bihar and Orissa Government. I speak from my knowledge of Orissa, which has more valuable fisheries and where trade in fish is more extensive than that of Bihar that so far very little has been attempted by the Fisheries Department to improve the industry in this benighted province. There is a sea board of over 200 miles from the mouth of the river Subarnarekha to the Chilka border of Madras, almost as long as the East coast of England, with such important ports as Balasore, Chandbally, False Point, and even Puri, with the magnificent railway system of the Bengal Nagpur Railway running parallel to the coast. This offers splendid opportunity for the Fisheries Department to study first hand the conditions under which the seafishermen ply their trade and to instruct them to improve their lot, but little has been done during the five years' existence of this department. I have worked with some of them and lived among them and I say most unhesitatingly that there is no better set of fishermen than these fellows anywhere in India, noted for their seafaring qualities, adventurousness and heroism in rescuing lives and property. Not long ago the Nuliah fishermen of Puri saved the life of an Indian Civil Service officer who was caught by an under current while sea-bathing. I strongly advocate the establishment of a small navigation and training school for fishermen and mariners, somewhere near Chandbally, where boat building, sail making, navigation, preservation of fish, and other allied subjects essential for the seafishing industry should be taught with money that is now being spent on the upkeep of a Fisheries Department located hundreds of miles away in another province, far out of touch with the needs of an industry of first rate importance. It is a matter of common knowledge that the British mariners who are now watching the shores of England like bull dogs ready to hunt down German invaders are partly recruited from the fisher folks who toil unceasingly on the coasts of Great Britain and Ireland. After our experience of the ravages of the "Emden" we may yet need a small naval squadron for the defence of our East Coast and why should we not recruit our Indian blue jackets from our seafishermen if they are trained in the same way as his fellow workers are in Japan and elsewhere? I should like the Government to seriously consider the question of training Indians for a seafaring life. I happened to be, while I was in London, the Honorary Assistant Secretary of the British Indian Seamen's Institute in the Docks of London and I had considerable dealings with the Indian Lascars "whose labour," says Lord Ampthill, "contributes to the national wealth and prosperity upon which our security and very existence depend." We need more of these men and better trained than they are now for our Indian mercantile marine which is a necessary adjunct of all industries in India. The reading of books like "Robinson Crusoe" must have fired the imagination of many Indian youths and stirred their spirit of adventure, but unless there is an opening for them in the Indian marine or other equally adventurous vocation this spirit will remain bottled up and will burst, as it is now doing, in mischievous activities.

Touching on the question of training I am not in favour of any college of industry, neither any degree in commerce. The course for the Bachelorship of Commerce has proved a failure even in the University of Manchester backed as it is by the local leaders of industry and commerce. With the exception of simple subjects like book-keeping, stenography, etc., commerce cannot be learnt in academies. It is the probationers and apprentices in the big city house that we must look to for attaining fame as our future captains of industry and our merchant princes.

The Departments of Director of Statistics and Director of Commercial Intelligence are only infant institutions and, under able heads like the present Director of Statistics, are likely to play a great part in the future of our commerce and industry. The *Indian Trade Journal* is a useful magazine and should be more useful if printed in vernacular as well. Publications of the Geological Department, which have led to important discoveries and the subsequent foundation of great mining companies, are of very high order, but no one seems to attach much importance to Forest or even Agricultural reports for commercial and industrial guidance.

Railways and waterways.

So far as the province of Orissa is concerned it is high time that the project of linking Bhadrak, a station on the Bengal Nagpur Railway, and Chandbally, a great port of Orissa,

by a light railway of 28 miles was carried out. This will, among others, help the fishing industry materially. Chandbally is adjacent to the important fisheries of Dhamra belonging to the Hon'ble Raja of Kanika and offers the finest refuge for sailing smacks or trawlers even in the worst monsoon. It is not far from the important banks discovered and charted during the "Golden Crown" experiment full of prime fish hauled by that vessel and with advent of capital is likely to be the Grimsby of the Bay of Bengal. The Orissa coast canal system is one of the best in India and I suggest that the branch or channel, a matter of about 20 miles, connecting Mahanady with Chilka Lake, which is only navigable during rains should be excavated to form a connecting link between the border of Madras (Ganjam) and Hoogly *via* the Chilka Lake. This will incidentally help cheap transport of dry, desicated and salt fish and other merchandise from Puri and Ganjam to Bengal and even the Central Provinces.

I have already indicated the lines on which the Government should proceed to help the fishing industry in Orissa. The fishermen in this backward province are constantly in the grip of money-lenders and to free them from indebtedness the co-operative credit society should form local societies in Puri and Balasore. Such societies should help the fishermen to buy better nets and boats with advances on the security of their catches to be marketed collectively and more profitably for the benefit of the men. There are extensive private fisheries in Chilka in the district of Puri and also in Balasore which are leased direct to fishermen but neither the owners nor the lessees take protective measures for conservation of fish and it should be the business of the Fisheries Department to instruct them to avoid capture of immature fish and thus save the fisheries from rapid exhaustion now in progress. Attempts recently made by the Fisheries Department to control Government fisheries and impose restrictions on lessees as to close season, etc., are quite commendable but care should be taken to introduce these innovations gradually and with the approval of fishermen. Their living is as precarious as ever, depending on seasons the failure of which means sheer starvation as most of them on Orissa coast have no lands to fall upon and their security is too poor to get loans from village money-lenders. It is to be hoped that they will not be forgotten in any new organisation now being proposed to improve industries in Orissa.

Little has been done so far to encourage industries based upon the utilization and manufacture of marine produce and fish products, with the exception of shell-buttons and other minor industries. There was, according to Dr. McLelland, an extensive trade before 1867 between China and Bengal in Indian isinglass, *viz.*, dried air bladders or sounds of the fish known as *Polynemus Indicus* or tassel fish commonly called *Sahal* in Midnapore. The trade is practically extinct now, although huge shoals of this species, which belongs to the same family and looks like our Bengal *Topsi* only very much larger and weighing between 10 to 30 lbs., visit the shores of Balasore and Midnapore regularly in October of every year. I had samples of this isinglass sent to a London house who expressed willingness to buy any quantity of it at very remunerative prices. I have also found that the fish itself, if properly smoked, will be welcome as a breakfast delicacy on European tables but the difficulty is to devise suitable boats, gears and nets to haul them, when they come in sufficient quantity, to feed a small factory. Probably a co-operative society in Contai Sub-division of Midnapore, noted for this fish, will find it profitable to revive the trade. The most valuable substance obtained from fish refuse is oil which is mostly used for medicinal purposes, (*e.g.*, cod liver oil) but which is also converted into "curriers' oil" while a certain amount is used in the manufacture of soaps. The livers of sharks and rays, which abound in the Bay of Bengal and adjacent estuaries, are the principal sources of fish oil. It is well worth the attention of the Government to start an experimental factory to extract oil and engage in other researches somewhere in the vicinity of Puri. We have heard a good deal of conch-shells being imported from Madras to Bengal in very large numbers. I firmly believe from samples brought to me occasionally by sea fishermen that there are important beds of these shells not far from Orissa Coast awaiting discovery and exploitation. Another important industry which employs thousands and has escaped the notice of the Fisheries Department is the produce made from boiled shrimps and prawns, which is exported in bags from Khulna and Chilka Lake to Burmah where it fetches almost fancy prices. I made some experiments myself and found that shrimps made into paste and sauce and large prawns properly canned, as they do in America, are very attractive commodities, and raw materials for such products are enormous in Chilka alone and well worth exploiting in a Government experimental concern. Sardines and small species of the sprat family swarm on the coasts of Puri and Ganjam and only a fraction of them is caught by foreshore fishermen with their old fashioned boats and nets. If one could only place a dozen sailing drifters with modern nets and gears, hauls will be enormous and more than repay capital outlay in two or three good seasons. The sardines and sprats could be profitably utilized for production of oil and the refuse converted into fertiliser known as fish guano which can be sold by thousands of tons to Calcutta merchants. In Egypt fish skin leather is made from Red Sea fishes and glue and gelatine is manufactured out of fish scales and there are many other aspects of fish economics which will offer field for researches by the Government fisheries expert instead of his working elaborate theories regarding the habits of hilsa or breeding of carps, which are best left in the hands of the zoologists. The fishing industry in Bengal and Orissa is now passing through a state of transition from primitive to modern tages and requires every support that the State can lend. My own experiments or adventures confirm that the boys of "bhadrolog" or middle class are gradually attracted to it on account of small capital investment and ordinary skill necessary to achieve fairly moderate success. I find that they are beginning to appreciate dignity of manual labour and are slowly and surely

forgetting to despise the so-called low class labourers round Chilka lake and elsewhere engaged in catching, transporting and desiccating fish and from which they are now learning to earn their daily bread instead of driving quills in the chambers of city houses.

ORAL EVIDENCE, 16TH JANUARY 1917.

Mr. C. E. Low.—Q. What is your profession?—A. I am now an organiser of fisheries.

Q. Is that an honorary post?—A. No. It is purely a commercial venture. I belong to a private company. It has been working for the last four years.

Q. Is it succeeding at present?—A. To a certain extent. Of course I have my difficulties just as others have in their ventures.

Q. We have been told that your proposal is a very difficult proposition, because the fish population of the Chilka lake varies in different parts of the year?—A. I am there practically all time and I know more about its conditions than a gentleman who comes there occasionally and I do not suppose that I can agree with him. Of course fishes do vary in different places of India. That condition is prevalent all over the world.

Q. Where does the capital of this fishery company come from?—A. It is subscribed by a few friends of mine, who are commercial men, pure and simple.

Q. Had you had any training in fishery work?—A. I had my training in Grimsby. I was there for 2½ years.

Q. In the first paragraph of your evidence you say "The time is not far when the landed aristocracy, particularly of Bengal, will open their purse strings for capitalising industries specially approved of by experts." What experts?—A. Government experts.

Q. What is your reason for thinking that they will do so?—A. Because the zamindars take a considerable interest in anything that is patronised or in any sense backed by Government, and as soon as they find out that so and so industries are under the supervision, or initiative, or the instruction of Government, they will naturally pour in capital. This does not apply to the middle classes because they follow practically their own way of thinking. I am thinking of Bengal zamindars.

Q. But you recognise that even with an industrial organisation of considerable efficiency it is likely that there will be a certain number of failures?—A. Yes.

Q. What about those failures? Would not you find people turning upon Government and saying, 'You advised us and we have lost our money'?—A. Government would not undertake any liability for the failure or success of a business. They will do conscientiously what they can to put the promoters in the right track and that is a sort of guarantee to the capitalists.

Q. Take a reputable firm, or a good agency house in Calcutta. They go through a proposition and they think that it is good enough and put it before the public. In some cases it succeeds but in a few cases it fails. The public dealing with private concerns recognise that there must be a certain percentage of failures and they have not very much to say about it, but if it were Government, don't you think that a good deal of excitement would be created?—A. When I particularised the zamindar class as distinguished from the middle class, I really wanted to impress that the zamindar class have plenty of money in their hands, and simply at the dictation of the Government they would be only too pleased to pour it into enterprises. I do not say that the zamindar can fall back upon the Government for refund of the money, but if the Government is convinced of the importance of an industry or the benefit that is likely to be derived from it the Government may reasonably be expected to advise the zamindar to put money into it and that advice would be not merely advice but a sort of dictation to the zamindar—I mean by dictation, not arbitrary dictation but in the sense that a Maharaja of so and so is asked to subscribe to a charitable purpose. I do not compare charity with industry.

Q. Lower down in the same page, you say, "There should be more co-operative societies specially formed with Government aid and organised to finance cottage and rural industries and market produce or manufacture on advantageous terms." Have you had experience of co-operative societies?—A. Not practical experience, but I have watched its growth.

Q. By Government aid you mean Government finance?—A. Under Government supervision—the same as the Registrar of Co-operative Credit Societies is doing.

Q. But does not the Registrar organise industrial societies at present?—A. He does, but he is too full up and he expects also the public to do things on their own initiative and then go to him for help. I mean there ought to be more education about the benefit of co-operative movement.

Q. Have you seen anything of the working of the Calcutta Commercial Museum?—A. I did pay a visit to it.

Q. Do you think its site is a suitable one for the purpose it is meant?—A. So far as the location in Calcutta is concerned it is quite all right, but if you take it for the whole of Bengal or for the whole of India, it offers difficulties to visitors, to the purchasing public, and so on as I have pointed out.

Q. As it is organised mainly to assist small industries to sell their products you think it is all right where it is?—A. Location in any place would not make any material difference.

Calcutta is not a huge city like London or New York. Bow Bazar, or China Bazar or Clive Street would not make any difference.

Q. Do you think that the commercial museum should undertake a sales agency business for cottage industries, or should any other organisation be formed as a sales agency for cottage industries?—A. I am not very keen on Government undertaking to sell any things. They are not very smart business men, I mean the agents appointed by the Government, unless they have had special training in the particular line.

Q. Referring to the land policy of the Government, you allude to the Khasmahals Act which precludes grant of land excepting for purely agricultural purposes. I do not know the Act, would you explain it a little more fully?—A. In fact, I did not go through the Act myself but I am talking from personal experience. I wrote to the Sub-Divisional Officer of Khurda, who is the manager of the Khasmahals State, for a grant of a piece of land and he referred the matter to the higher authorities and he eventually told me that there was a certain section in the Khasmahals Act which precluded the grant of land. The sub-deputy under him also told me that the land was reserved for agricultural purposes and nobody was allowed into it because it would trespass on the agricultural reserve of the locality. But I explained to them that one acre would make no material difference, but they said that I should go to higher authorities. I then saw the Collector of Puri over this matter and he asked me to write to the Commissioner and so on, but I did not as I had a plot of land let out to me by one who had it leased from the Government, and I thought it was not worth my while to go to the higher authorities on the matter. I have found that, in the case of my business as well as other small businesses started there, the Government puts all sorts of obstacles in the way of acquisition of land for non-agricultural purposes—I do not mean the Government in the particular district there.

Q. You suggest the establishment of a small navigation and training school for fishermen and mariners, somewhere near Chandbally where boat making, sail making, navigation and preservation of fish and other allied subjects should be taught. How could experts in boat making and sail making be obtained?—A. We do not want any special experts to be imported from abroad. In India there is a bit of sea fishing industry in Madras and west coast and Cochin. They are more advanced than the people of Orissa and a few can be brought over from there. They are expert sail makers, boat builders, and sailors and there might be one trained fisherman from Japan to supervise them.

Q. Each particular coast has its own types of boats and sails which are suitable there and not elsewhere—I mean there is difference not only in local conditions, but also in the materials available?—A. To a certain extent it is so. As a rule they have got to use wood and plank, and whether it is sal plank or some other plank it does not so much matter.

Q. Do you think that a school is practicable?—A. That is very practicable. There is a school at Grimsby which is a very old one. I know that when they started the school the fishermen would not come to it because they thought it was waste of time. After the people began to see the advantage of having school-training in sail making and other crafts, students went to it in great numbers. In the beginning we have always the difficulty of getting people to come or getting the proper people to train, but once a beginning is made, I think we shall be able to get proper men to teach and suitable people to be taught.

Q. Whom do they get to teach them in Grimsby?—A. They have got an ex-trawler captain so far as the trawling portion is concerned. They have got boat builders, sail makers and navigators. In Madras we have the instance of a Fisheries Department started by Sir Frederick Nicholson and he, I believe, in a small way, has started a school somewhere, but I am not sure about it—somewhere near Cochin, but I have not tried to ascertain that particular point. I only want to say that what is done there may be repeated here.

Q. You suggest that something should be done to make available the deep sea fish which you say exists off the Orissa coast, and you suggest a co-operative society. Don't you think that it is rather too big a thing for a co-operative society?—A. I suggested a co-operative society in a particular sub-division to tackle the small industry of isinglass only.

Q. Would you mind looking at it from the question of deep sea fish which is practically untouched there. You have got to organise your means of collecting fish, you will have to get expensive boats, and you have got to devise means to preserve the fish either by cooling or by some other method, and you have got to get your means of transport and arrange the market, and that is a large undertaking? It is apparently being tackled in Madras?—A. Yes.

Q. Do you think that it is a kind of work that the Government ought to take up in the first instance, if private enterprise is not forthcoming?—A. After our experience of the "Golden Crown" it is very difficult to say.

Q. We have been told that the "Golden Crown" was not intended to work up the trade, but only to find out whether there was fish there?—A. The people who are interested in fisheries know that. The class of people and the class of boat selected were not suitable for the business. For example, you appoint a statutory civilian to be the director of fisheries or that sort of thing. Fish used to be brought by the "Golden Crown" and allowed to rot. There was no arrangement to take the fish to the market. What I say is that the Government might repeat the experiment very conveniently on a smaller scale not with steam trawlers but sailing vessels.

Q. Do you think that one sailing vessel would be sufficiently regular to cover the trade?
—A. Not one, but a dozen sailing vessels.

Q. You have got to have either cooling arrangements or freezing arrangements or preserving arrangements?—A. The business in fish is not merely in fresh fish. For dry fish there is a ready market. You can do away with the idea of fresh fish business and start with dry fish business, and when this is successful you can go for a refrigerator or ice making plant or that sort of thing for fresh business. We have got plenty of coolies in Calcutta down the river Hooghly, and they will only be too glad to pay a decent price for mere dry fish which they cannot get now because it is too expensive for them and fresh fish is a luxury. You give them what they want and what they are accustomed to.

Q. Where from is dry fish brought to Calcutta?—A. In Calcutta at present there is no big market for dry fish. What little supply there is from Orissa and the Madras Presidency goes to Burma where there is a big demand. In Calcutta dry fish is sold in one or two markets, where they have Chinese customers and also in the Calcutta New Market.

Q. Does the mill coolie purchase dry fish when he gets a chance?—A. The up-country coolies do not care for fish. Amongst the coolies there is a class of people who are accustomed in their native homes to eat dry fish. The Uriyas will eat it very comfortably and they will want it more.

Q. Do that class of people get it in Calcutta?—A. No, because the price is very high. It is eight annas a seer in Tiretta Bazar.

Q. At what price could it be landed at Balasore?—A. It is the price of labour. There is no fixed scale of wages. There is a sort of division of the produce. The owner of the boat gets a share and the crews get a share. From my own experience I find that you can land fresh fish of good quality at one anna and nine pies a seer in Balasore or Puri or Chandbally.

Q. Does not dry fish at present come from Orissa or Balasore to Calcutta?—A. They go to Burma. There is a great local consumption amongst the inhabitants of the feudatory principalities. They get it there for 4 to 5 annas per seer and the price is a little too much for them. If the price is reduced to three or two annas the consumption will be trebled or quadrupled.

Q. You say towards the end of the last paragraph, "The boys of bhadralog or middle class are gradually attracted to it." Have you any definite instances?—A. I can give you instances. A gentleman who passed his F. A. examination and was a clerk somewhere here, worked under me as my employé and he saved a few rupees and left me and started business on a small scale with a capital of R400 or R500 and he is making R50 or R60 a month.

Q. What does he do?—A. He simply works as a middle man. He helps the fishermen to get more fish than they would get when they were left to themselves.

Q. By giving them advances?—A. Yes and by telling them the advantages of having improved things and systems.

Q. Have you had any instances of bhadrals going out with a boat or owning a large boat?—A. I know of bhadrals owning boats but not actually fishing but following fishermen to see that the fish are not sold away to anybody else. At present they get fishermen for 2 or 3 annas a day. The bhadrals go daily with the boat.

Q. Are any considerable number of bhadrals doing that?—A. I know of about 20 or 25 cases, in Puri, Orissa, Eastern Bengal, Goalundo, Khulna, Monghyr. They go up there and buy fish and send it to Calcutta. They supervise the fisherman and make advances and so on. They have some representatives in Calcutta who receive it on their behalf.

Q. The fishermen at present cannot organise their market and they are in difficulties?—A. Yes.

Hon'ble Pandit M. M. Malaviya.—Q. You say at page 2, "Banking facilities in marketing indigenous products are absolutely essential," and you say that the banks would not advance a pice against a hypothecation of products or plants and properties and that many important industries under Indian management have failed on that account. Have you any instances in mind which you would mention to the Commission?—A. I do not like to be personal. I know of one Calcutta tannery. Their finances were rather in a low condition and they applied to banks. Of course, the very name of an Indian factory frightened the bankers and they deputed people to make enquiries and they found that it was not well organised and so on, but they did not go into the question of assets. Everything has got an asset, and even a little cottage is purchaseable and saleable. That particular factory was certainly worth R50,000. A capital of over a lakh was invested on it and it is under the proprietorship of a well-known gentleman in Calcutta. They wanted, to begin with, R10,000 or 12,000, as advance.

Q. They did not get the amount?—A. The bank made all sorts of enquiries and finally the matter was dropped. The general impression amongst the Indian capitalists and proprietors of factories here is that the doors of exchange banks are closed to them.

Q. What kind of bank was it?—A. It was an exchange bank.

Q. You suggest "the creation of a department in Presidency banks to deal with this matter and to have proper powers to advance money against goods, bills of lading, and assets." Suppose that the Presidency banks cannot start a department such as you suggest, would you be in favour of starting a separate bank?—A. The difficulties in the way of starting a separate

bank are that it would have in the initial stage to undergo difficulties, it would not pay, whereas in the Presidency banks there is a certain amount of Government deposit and the Government might induce them to make an experiment and place one of their representatives to look after that particular business of advancing money against commercial properties, against factories and so on. If you have got to start a new bank you will have to undergo all the paraphernalia. Which will be very slow work.

Q. The Presidency Banks would not like the Government to put one of their representatives on their Board?—A. I fancy the Presidency Banks owe their existence to Government support.

Q. But assume that they do not see their way to accept your suggestion, the only other course is to open a separate bank?—A. Yes. There is no other way of dealing with it.

Q. You think that unless more banking facilities are available the Indian industries cannot improve?—A. Yes. They cannot improve even a bit.

Q. Speaking of the training of labour and supervision you suggest that certain factories should be provided for theoretical training of employes by holding occasional classes and demonstrations. In how many centres would you have them?—A. In all industrial centres. If you take Bengal, Calcutta is the right place. If you take Orissa, Cuttack is the right place, for Bihar, Bankipur. I am thinking of economy. I want as a beginning that some of these workshops should be subsidised by Government for this particular purpose and I have seen things of that sort abroad.

Q. You speak of the apprenticeship system. Did you in your experience find workshops in England admitting Indian students as apprentices in large numbers?—A. There is no remarkable prejudice against Indians or anybody, but the thing is that the workshops are run on very much different lines from here. For example, the trade union people have got their own opinions and they do not like anybody coming in to learn work eventually with the idea of competing with them on cheaper wages. That is due to ignorance and once they are convinced that the Indian boys are going back to India to work in India they will not object. There is no marked prejudice excepting in certain special industries as manufacturing chemicals, where of course they do not want Indians to learn the secrets of certain processes. I know Messrs. Brunner Mond and Company at Northwich would not allow anybody to enter their firm to learn any special processes in manufacture of chemicals.

Q. You say you were the Secretary of the Manchester Indian Association and that it was part of your duty to help young Indians to enter manufacturing firms as ordinary or premium pupils. What is your experience? Did you find that in 50 cases out of 100 that you took up these pupils were admitted or not admitted?—A. The admission was not refused on the ground that they were Indians.

Q. I want to know as a fact whether you found that they could find admission or not?—A. When there was a vacancy we always found room for an Indian. They will be glad to take an Indian.

Q. In your experience were you able to find admission for 50 per cent. of those for whom you endeavoured to seek admission?—A. With the exception of one or two cases I succeeded everywhere.

President.—Q. To what firm were you apprenticed?—A. Hans Renold, Limited, Upper Brook Street, Manchester.

Q. Have you given up engineering?—A. Yes.

Q. Why?—A. Firstly because I found that the jobs offered to me were not attractive on account of the low remuneration attached to them. Secondly, I was keen on Government Service and I found that there were a lot of difficulties in getting Government service because they have got to give preference to men from the Sibpur and Roorkee Colleges and they cannot take all students trained in England. I gave up engineering because I found I cannot get jobs on the terms I should like to.

Q. You tried any firms?—A. I tried Messrs. Martin and Company, and Sir Rajendra offered me a job worth R100 and I told him that I had invested R12,000 on my education and if I had invested that money—

Q. Sir Rajendra started on less than R100—A. He did not spend so much money as I did on my education. I made a mistake there and I admit it. I had a sort of conceit or vanity.

Q. After that you took up fishery?—A. After spending some time here in commercial work, I took up fishery and went back to England to study fishery.

Q. And you are engaged in a fishery firm?—A. Yes. We formed a fishery company called Chilka Fisheries.

Q. Is that company organised by yourself?—A. Yes.

Q. You had left the original company before that?—A. Yes.

Q. You did not go to England originally as a Government scholar but as a private scholar?—A. Yes. When I went to England first I studied engineering in the Manchester University, but subsequently when I went back I did not join any school, because there was nothing to learn there. I went to Grimsby and joined a trawling company.

Q. You went to Owens College and took up your degree in engineering?—A. I took the diploma course in engineering.

Q. You were there for three years?—A. Yes. For a year I was meteorologist in the University of Manchester under Professor Schuster. Professor Schuster during the absence of Mr. Bell asked me to do it.

Q. You are getting on all right with your Chilka Fisheries?—A. No. There are failures and disappointments.

Hon'ble Pandit M. M. Malaviya.—Q. Had you to work at any time with a bachelor of commerce?—A. I did not work with any bachelor of commerce. I know how he is looked upon by the commercial people and financiers.

Q. Have you had any practical experience of working side by side with a bachelor of commerce in Manchester?—A. No.

President.—Q. You were at home ten years ago in the Owens College?—A. Yes.

Q. Before the faculty of commerce was established?—A. It is a thing I experienced after I returned. When I went back I used to re-visit Manchester and used to meet commercial men.

Q. And there you get this impression that the Manchester graduates in commerce were worthless?—A. I tell you why I have got such an impression. There was a meeting of the University. Sir Forbes Adams who was a partner in Messrs. Graham and Company, said, if I remembered rightly, that these bachelors of commerce who had been produced lately by the Manchester University were not doing well. I have also heard from the students.

Q. What year was that?—A. 1910 or 1911. One or two Bombay students—I mean Parsi students—who went in for this bachelor of commerce degree told me that the only opening for them would be to act as professor of commerce when they went back unless some public gentlemen like the great Tatas took them up.

Q. You know Mr. Rowbotham?—A. I do not exactly remember.

WITNESS No. 184.

Mr. J. Findlay
Shirras.

MR. G. FINDLAY SHIRRAS, M.A., F.S.S., I.E.S., *Director of Statistics, Calcutta.*

WRITTEN EVIDENCE.

NOTE ON THE DEPARTMENT OF STATISTICS, INDIA.

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This Memorandum deals with (1) the collection and (2) the distribution of statistics by the Department of Statistics, India.

I.—THE COLLECTION OF STATISTICS.

2. It is, perhaps, unnecessary to refer to the history regarding the collection of Indian statistics. For over half a century the publication of statistics has been systematically undertaken by the India Office. In India a Director-General of Statistics was appointed in 1871. The first occupant of the post (Sir William W. Hunter) was connected chiefly with the organisation of a statistical survey of the Indian Empire which began in 1869. The different departments of the Government of India Secretariat compiled their own statistics. The Department of Revenue and Agriculture, *e.g.*, had, as one of its functions, "the more

complete and systematic ascertaining and rendering available of the statistics of vital, agricultural and economic facts for every part of India, in order that Government and its officers may always be in possession of an adequate knowledge of the natural condition of the country, its population, and its resources." By 1895 it was considered that the disconnected manner, in which Indian statistics were compiled and published, seriously detracted from their value, and that their intelligent examination, collation, and discussion were necessary in order to secure uniformity and to render these statistics as useful as they might and should be. The periodical returns of the Departments of Revenue and Agriculture and of Finance and Commerce, together with those of the Home Department, were placed under the charge of Mr. J. E. O'Connor, C.I.E., as Director-General of Statistics. In this capacity he was an independent officer who published his compilations and reviews in his own name and on his own responsibility, although he dealt with the statistics belonging to each department in communication with and under the general direction and control of that department. This arrangement continued until 1905, when the Department became a part of the new office of the Director-General of Commercial Intelligence. From the 1st April 1914, a Department of Statistics under a Director was formed, as the experience of the working of the Commercial Intelligence Department, as constituted in 1905, had shown that a Commercial Intelligence Department and a central Statistical Department could not, consistently with efficiency, be combined under the charge of one officer. The Secretary of State agreed with the Government of India that the compilation and publication of statistics required the undivided attention of one officer. He assumed that it was intended that the Director of Statistics should be responsible for the issue of the general crop forecasts and reports. The system, introduced in April 1914, obtains at the present time, and the department compiles and publishes statistical returns and reports on behalf of the various departments of the Government of India, such as the Commerce and Industry Department, Home Department, Finance Department, Department of Revenue and Agriculture, and Department of Education, as well as in regard to the inland and frontier trade of Bengal on behalf of the Government of Bengal.

3. The office establishment consists of 73 assistants (including two temporary clerks) and 2 Superintendents and is divided into two main divisions, each under a Superintendent. The first division comprises six sections and the second four. Section I, the Registry and Issue Section, deals with the receipt and issue of letters, as also with pay, pensions, distribution of publications, record, etc.; Section II deals with prices and freights; Section III with wages statistics; Section IV with judicial, administrative, educational and vital statistics; Section V with rail and river-borne trade statistics; Section VI with statistics relating to the rail and river-borne trade and frontier trade of Bengal; Section VII with sea-borne trade returns, including coasting trade, treasure, shipping, and customs duties returns; Section VIII with frontier trade; Section IX with agricultural returns and crop forecasts; and Section X with commercial and financial statistics.

The strength of each Section is as follows:—

	No. of Assistants.
Section 1—General	7
" 2—Prices and Freights	5
" 3—Wages	2
" 4—Judicial and Administrative Statistics	4
" 5—Rail and River-borne Trade	6 Including one Statistical Auditor.
" 6—Bengal Statistics	10
" 7—Sea-borne Trade	21
" 8—Frontier Trade	6
" 9—Agricultural Statistics	6
" 10—Commercial and Financial Statistics	6
Total	73

4. *Prices and Wages.*—Sections 2 and 3 deal with the statistics of Prices and Wages. The publications compiled in these sections are:—

- (1) Prices and Wages in India.
- (2) Variations in Indian Price Levels expressed in Index Numbers.
- (3) Fortnightly Return of Wholesale and Retail Prices.
- (4) Occasional publications, *e.g.*, on war prices and freights, etc.

5. *Prices.*—The prices of food-grains, etc., in the principal marts in India are compiled from the fortnightly statements of wholesale prices received from the provincial Directors of Agriculture and other local statistical officers in the several provinces of British India and the Resident in Mysore. The prices of commodities imported into and exported from the chief Ports are generally taken from the Prices Current published by the different Chambers of Commerce. The prices paid by the Supply and Transport Corps are supplied by the Quartermaster General in India. The prices in the United Kingdom are compiled generally from the "Economist" and the "Corn Trade News." The retail prices of the principal food-grains and salt in British India and in certain Native States (Rajputana, Central India, Hyderabad, and Mysore) are compiled from the fortnightly statements of retail prices at the head-quarters of districts, received from the Directors of Agriculture and other local officers in the several provinces of British India and from the political officers in Native States.

6. *Prices*.—Variations in Indian Price Levels expressed in index numbers are compiled mainly from the figures published in the volume of Prices and Wages. This pamphlet, which is not an annual one, exhibits four series of Index Numbers of prices in India. The first is a special index number for imported articles (11 in number), the second is a special index number for exported articles (28 in number), the third is a general index number for the articles (39 in number) for the preceding two special index numbers, and the fourth is a special index number for the retail prices of 7 food-grains (cereals and pulses).

* Appendix X.
(Not printed).

7. *Prices*.—The fortnightly return of wholesale prices deals with food-grains, oilseeds, sugar-raw, ghee, salt, tobacco leaf, turmeric, grass, straw, jawar stalks, bhusa (white), bran, sheep, plough bullocks, and kerosene oil, and that of retail prices deals with food-grains and salt. The figures are compiled from the statements furnished by the provincial Directors of Agriculture and other local statistical officers in the several British Provinces and political officers in the case of Native States. The local figures are scrutinised, consolidated, summarised, and then published with summary tables in the *Gazette of India*.^{*} This section is entrusted with the preparation of other statements regarding prices and freights, e.g., the fortnightly statement of wholesale and retail prices of wheat, the Calcutta index numbers of wholesale and retail index members. This Section also compiles quarterly rate lists of stores purchased in England for Government departments in India. The lists contain information as to Home prices as well as the cost of sea freight, insurance, freight brokerage, landing charges, import duty, and interest.[†]

† Appendix XX.
(Rate Lists.)
(Not printed)

8. *Wages*.—The statistics of wages are those paid to certain classes of labourers and artisans in districts and in certain railways (East Indian Railway and North Western Railway) and Government establishments, as well as in certain private industrial establishments in various parts of India. The district wages are compiled from the returns of wages received from the different provincial authorities and from the Political Officers in Native States. The Provincial reports are half-yearly in the case of British Baluchistan and Native States (Rajputana, Central India, Hyderabad, and Mysore), yearly in the case of the Central Provinces, and quinquennial with regard to the other British Provinces. The wages regarding Government and railway establishments are furnished by the heads of the establishments concerned. Those regarding private industrial establishments are supplied by the managers of the concerns. The statistics of wages paid in industries are meagre and refer generally to a representative mill in the chief locality of the industry. Returns are not yet received of wages paid in the various mills of each industry.

Charts are ordinarily appended to the publications of these sections to illustrate graphically the variations in prices, etc.

9. *Public Health, Administrative, Judicial, Local Self-Government, and Educational Statistics*.—Section 4 deals with Judicial and Administrative Statistics. These statistics (with the exception of the sections relating to Area and population, Emigration, Passengers by Native Passenger Ships, Port Trusts, Port Blair, Pilgrims by Pilgrim Ships, and Medico-legal investigations) used to be compiled formerly in the Home Department, but the work connected with these statistics was transferred in 1896 to the then newly created Statistical Bureau under the Director-General of Statistics. The following are the publications of this Section :—

- (1) Public Health (Volume III of the Statistics of British India—Statistical Abstract).
- (2) Administrative, Judicial, and Local Self-Government (Volume IV of the Statistics of British India—Statistical Abstract).
- (3) Education (Volume V of the Statistics of British India—Statistical Abstract).
- (4) Special returns for the Home and the Education Departments (*vide* paragraph 12 below).

10. *Public Health*.—This volume contains five sections, namely, (1) Vital Statistics, (2) Hospitals, (3) Lunatic Asylums, (4) Vaccination, and (5) Wild Animals.

(1) *Vital Statistics*.—This section deals with statistics relating to births and deaths, and is compiled from the Annual Sanitary Reports supplied by Local Governments and Administrations and the Sanitary Commissioner with the Government of India.

(2) *Hospitals*.—This section deals with the statistics relating to the different classes of hospitals, the number of in-door and out-door patients treated in them, the diseases for which they were treated, together with the number of deaths among the in-door patients treated. Figures are compiled from annual reports on hospitals and dispensaries supplied by Local Governments and Administrations.

(3) *Lunatic Asylums*.—This section deals with the statistics relating to lunatic asylums, the number of lunatics (male and female) admitted into them, the types of insanity among the lunatics, and their causes. They are compiled from annual reports on lunatic asylums supplied by Local Governments and Administrations.

(4) *Vaccination*.—This section deals with the number of operations (primary and re-vaccination) performed by the agency of a special department established for the purpose, and to a small extent by the staff attached to the ordinary hospitals and dispensaries, as also by other agencies. Figures are compiled

from annual reports on vaccination furnished by Local Governments and Administrations and the Sanitary Commissioner with the Government of India

- (5) *Wild Animals*.—This section deals with the statistics relating to measures adopted for the destruction of wild animals and snakes and the number of human beings killed by them. The statistics are compiled from the provincial reports on the destruction of wild animals and snakes furnished by Local Governments and Administrations.

11. *Administrative, Judicial, and Local Self-Government Statistics*.—There are seventeen sections in the volume of Administrative, Judicial, and Local Self-Government Statistics. The sections are stated below :—

- (1) *Area and population*.—This section, broadly speaking, presents data relating, firstly, to the population of India as recorded at the decennial census, and secondly, to area. The statistics relate generally to the last three decennial censuses. The section is compiled from the latest census tables and is revised every year by Local Governments and Administrations, which also supply the figures of land revenue and rates for the section.
- (2) *Administrative Divisions*.—The data presented are, firstly, the number of administrative divisions, districts, and sub-divisions in each province, and secondly, the total area, population, number of villages, and land revenue of each province. This section is compiled from table No. 3 of the section "Area and Population."
- (3) *Police*.—This section deals with cognisable and non-cognisable crime, the strength and cost of Civil and Military Police, and the general internal management of the force. It is compiled from the annual reports on the Administration of Police supplied by Local Governments and Administrations.
- (4) *Jails*.—This section gives information relating to convicts admitted into and living in the jails of the different provinces, together with particulars of the cost of guarding and maintaining prisoners, and of the earnings of the prisoners, and the net cost to Government. It is compiled from the annual report on the administration of jails supplied by Local Governments and Administrations.
- (5) *Port Blair*.—This section deals with the population (convict and free) of Port Blair and the receipts and expenditure of the Settlement. It is compiled from the statements appended to the annual report on the administration of the Andaman and Nicobar islands and the Penal Settlement of Port Blair.
- (6) *Registration* deals with the statistics relating to the operations under the Registration Act and is compiled from the annual reports of the Registration Department supplied by Local Governments and Administrations.
- (7) *Presses and Publications* show the number of printing presses at work, and the number of newspapers, periodicals, and books published in British India. The figures are supplied by Local Governments and Administrations.
- (8) *Emigration* deals with indentured emigration carried on under the Indian Emigration Act and rules framed thereunder relating to the emigration of natives of India. But certain persons who proceed to the Colonies or other foreign countries without coming under the operation of the Emigration Act, as for instance, in the capacity of shop assistants or personal domestic servants, are also taken into account in the statistics. The section is compiled from returns furnished by Local Governments and Administrations.
- (9) *Passengers by Native Passenger Ships*.—These statistics show the number of passengers carried in the native passenger ships on long and short voyages from Indian ports. This section is compiled from the provincial reports on the working of the Native Passenger Ships Act.
- (10) *Pilgrims by Pilgrim Ships*.—The data presented in this section are the number of pilgrims who sailed from, and returned to, British India to and from the Hedjaz under the provisions of the Pilgrim Ships Act and are compiled from returns furnished by the Collectors of Customs, Bombay and Chittagong, and the Port Officer, Karachi.
- (11) *Judicial Divisions*.—This section deals with the number of Judicial divisions, districts and sub-districts, and the number of the several cases of officers exercising Original or Appellate jurisdiction, in each province, as also the number of cases decided in, and the total receipts and charges of, the Civil and Criminal Courts in each province. The section is compiled mainly from data given in the annual reports on Civil and Criminal Justice supplied by Local Governments and Administrations.
- (12) *Civil Justice*.—This section shows the number, description, and general results of civil suits tried in the Courts of Original and Appellate jurisdiction of the different provinces, and is compiled from the annual reports on the Administration of Civil Justice supplied by Local Governments and Administrations and Provincial High Courts and Chief Courts.
- (13) *Criminal Justice* shows the number of offences reported, number of persons tried, general results of the trials, and the punishment awarded by the Criminal

Courts of the different provinces of British India. The section is compiled from annual reports on the Administration of Criminal Justice supplied by Local Governments and Administrations and the Provincial High Courts and Chief Courts.

- (14) *Medico-legal Investigations* show the number of cases of human and animal poisoning in which articles were chemically examined, distinguishing the poisons most commonly used in each province. The section is compiled from the annual reports of the Chemical Examiners supplied by Local Governments and Administrations.
- (15) *Municipalities*.—This section shows the population and constitution of municipalities in each province and their income and expenditure, and is compiled from the annual reports on the working of the municipalities supplied by Local Governments and Administrations.
- (16) *District and Local Boards*.—This section deals with the number and composition of the Boards and their income and expenditure. It is compiled from the annual reports on the working of the District and Local Boards supplied by Local Governments and Administrations.
- (17) *Port Trusts*.—This section deals with the constitution, income, expenditure, and debt of the Commissioners for the several ports, and is compiled from the annual administration reports of the Commissioners for the Ports of Calcutta, Bombay, Madras, Karachi, Rangoon, and Chittagong.

12. *Education*.—This volume deals with various educational statistics such as the number of public and private institutions and scholars (male and female) in each province, the number of university graduates and undergraduates in each province, the expenditure on education, etc. The figures are compiled from the annual reports on Public Instruction received from Local Governments and Administrations, and the Directors of Public Instruction.

Special annual compilations are made regarding wild animals and snakes, for the Home Department, and regarding education in all-India for the Education Department.

13. It should be noted that there is a considerable amount of labour involved in the compilation of the 'All-India' returns. Misclassification, incorrect returns, *e.g.*, totals, etc., are not uncommon, and the work connected with these statistics sometimes involves considerable correspondence.

14. *Inland Trade*.—Section 5 deals with the statistics relating to inland trade (Rail and River-borne) of India. These statistics used to be compiled formerly in the Revenue and Agriculture Department, but the work connected with them was transferred in 1895 to the then newly created Statistical Bureau under the Director-General of Statistics. The publications compiled in this section are:—

- (1) The Annual Inland Trade Accounts,
- (2) The Quarterly Inland Trade Accounts, and
- (3) The Monthly Trade Fluctuations in the imports of certain staples into the Chief Ports.

- (1) *The Annual Accounts* are compiled from the four quarterly abstracts. The quarterly returns are furnished by the provincial officers and certain railways in maunds and show the articles detailed in the list* enclosed. These returns are consolidated, progressive totals are made for four quarters, and figures are converted into hundredweights and posted in to the abstracts or working sheets from which the tables for the Annual Accounts are prepared. The supplementary tables relating to the trade of the Chief Port of Madras are compiled from the special annual statement supplied by the Board of Revenue, Madras.
- (2) *The Quarterly Accounts* are compiled from the returns furnished every quarter by the provincial officers and certain railways. The returns are consolidated, and totals are made and converted into hundredweights before publication. In the accounts for the second, third, and fourth quarters progressive figures for six, nine, and twelve months respectively are also shown.
- (3) *Monthly Trade Fluctuations*.—These relate to imports by rail and river and by sea into certain ports of the staples noted in the margin. They are compiled from the monthly figures furnished by the railway officials, Collectors of Customs, steamer companies, the Commissioners for the Port of Calcutta, etc., and contain monthly as well as progressive figures. They are published every month in the *Gazette of India*† with summary tables.

* Appendix IX.
(Not printed.)

Cotton—raw.
Wheat.
Rice.
Gram and pulse.
Linseed.
Rape and mustard seed.
Jute and Tea.
† Appendix XI.
(Not printed.)

The improvement of the Inland Trade Statistics as also the discontinuance of the publication of the quarterly accounts of the trade ‡ are under consideration.

15. *The Inland and the Frontier Trade of Bengal*.—Section 6 deals with the statistics relating to the inland and the frontier trade of Bengal. These statistics were formerly compiled in the Statistical Department of the Government of Bengal, but the work connected with these

‡ Since this was written it has been decided to discontinue these quarterly returns.

was, at the request of the Local Government, transferred to the Statistical Department of the Government of India in 1901. The publications compiled in this section are—

- (1) The Annual Inland (Rail and River-borne) Trade Report of Bengal.
- (2) The Annual Frontier Trade Report of Bengal.
- (3) The Monthly Trade Fluctuations in the imports and exports of certain staples into and from Calcutta.
- (1) *The Annual Inland Trade Report of Bengal* is compiled mainly from the quarterly returns received from the railway and steamer companies, canal authorities, and the Commissioners for the Port of Calcutta. The returns show only figures of quantity, and values are assigned to each article every quarter when the returns are made up. The average values are determined from the rates reported every quarter by the Collector of Customs, Calcutta, the Commissioner of Police, Calcutta, and certain selected district officers. Progressive totals are made of the four quarterly figures of quantity and value in the abstract, from which the tables of the Annual Report are compiled. The report contains two supplementary tables, showing the import and export trade of Calcutta by all routes, namely, by river, rail, road, and sea (coastwise and foreign).
- (2) *The Frontier Trade Report* deals with the trade of Bengal with Nepal, Thibet, Sikkim and Bhutan. It is compiled from the monthly returns furnished by the Deputy Commissioners of Darjeeling and Jalpaiguri and the Political Officer, Sikkim. The returns show the articles mentioned in the list * attached. These monthly returns are consolidated and progressive totals for twelve months are made in the abstract, from which the tables for the Annual Report are prepared. *Appendix XII.
(Not printed.)
- (3) *The Monthly Calcutta Trade Fluctuations* are compiled from the returns supplied by the railway audit offices, steamer companies, canal authorities, the Commissioners for the Port of Calcutta, the Collector of Customs, Calcutta, and the District Officers, Howrah and 24-Parganas. They show the import and export trade of Calcutta by all routes in certain principal articles, and contain monthly as well as progressive figures. The statistics are published monthly in the "Calcutta Gazette."† †Appendix XIII.
(Not printed.)

16. Foreign Seaborne Trade.

Section 7 is sub-divided into 4 sub-sections, namely—

	No. of Assistants.
(1) Imports, Foreign Trade	8
(2) Exports „	7
(3) Duty, Treasure, and Shipping	2
(4) Coasting Trade	4

This section, the largest in the department, deals with the foreign seaborne and coasting trade and navigation of British India and also with the customs revenue. The publications compiled in this section are :—

- (1) The Monthly Customs Revenue Statement.
- (2) The Monthly Accounts of the Foreign Seaborne Trade and Navigation of British India.
- (3) The Monthly Review of the Seaborne Trade.
- (4) The Seaborne Trade and Navigation Accounts for the calendar year.
- (5) The Annual Review of the Trade of India.
- (6) The Annual Statement of the Foreign Seaborne Trade of British India—
Volume I.—Abstract and Detailed Tables of Imports, Exports, and Re-exports.
Volume II.—Abstract and Detailed Tables of Trade and Shipping with each Country and at each Port and Returns of the Trade of Aden and of the French and Portuguese Possessions in India.
- (7) The Annual Statement of the Coasting Trade and Navigation of British India.
- (8) The Weekly Note on the Imports and Exports of Wheat, Jute, and Cotton at the Chief Ports.

Besides the above-mentioned regular publications, statistical tables showing the estimated value of the imports and exports of India at the prices prevailing in 1899-1900 to 1901-02 and in the year previous to the year of report, and periodical notes, e.g., exports to certain neutral countries, imports of motor cars, total value of merchandise imported into and exported from British India, etc., are also compiled and issued from this section.

17. Foreign Seaborne Trade.

- (1) *The Monthly Customs Revenue Statement* shows the progressive figures of sea and land customs revenue, excluding salt revenue, collected on principal heads of articles for ten years. The figures are received by wire from the Collectors of Customs (except from the Collector of Customs, Calcutta, who sends his return in manuscript), and from local authorities as regards cotton excise duty.

They are consolidated in this department and issued generally on the 6th of the month following that to which the figures relate. Copies are furnished to Government, and the statement is published in the Supplement to the *Gazette of India*.

* Appendices XIV,
XV and XVI.
(Not printed).

Appendix XVII.
(Not printed.)

- (2) *The Monthly Accounts of the Foreign Seaborne Trade and Navigation of British India* are compiled from monthly returns furnished by the Collectors of Customs, and are generally issued by the end of the 3rd week of the month following that to which the figures relate. The returns show the articles as detailed in the statistical lists Nos. 1, 2, and 3*, with the details of countries from which they are imported and to which exported. For consolidation these returns are posted into monthly abstracts (about 4,500 pages) in which totals for all-India and progressive totals are made. The monthly accounts are compiled from these abstracts. In every quarter, ledgers (22 in number) are also prepared from these abstracts for compilation of the tables of imports and exports from and to each principal country published in these accounts. These accounts are revised month to month on receipt of errata statements.
- (3) *The Monthly Review* is a supplement to the monthly accounts and is intended to give prominence to the special features of the month's exports and imports. This review is also published in the supplement to the *Gazette of India*.†
- (4) *The Calendar Year Accounts* are compiled just after the issue of the December accounts. They are exactly similar in form to the monthly accounts. Nine months' figures published in the December accounts are added to the figures for three months, January to March, of the previous official year, and the rupee figures are converted into sterling.
- (5) *The Annual Review of the Trade* is taken up after the accounts for March are issued in April. The statistical data regarding the sea-borne trade are obtained from the March accounts and the twelve-monthly abstracts and ledgers. The data regarding prices, wages, freights, and inland and frontier trade are also compiled in the respective sections of this department.
- (6) *The Annual Statement of the Foreign Seaborne Trade of British India*.—Volume I is compiled from the twelve-monthly abstracts and ledgers. The monthly returns are furnished by the Collectors of Customs in rupees and the rupee figures are posted into the abstracts for the monthly accounts. The progressive figures in the twelve-monthly (annual) abstracts are converted into sterling and the annual ledgers are compiled in sterling notation; from which abstracts and ledgers tables of the annual volume are compiled.
As regards Volume II, the tables relating to the trade with principal countries are compiled from the annual ledgers. The shipping and duty tables are compiled from the abstracts of monthly returns. The trade at the chief ports is compiled from the advance proof of provincial annual statements, which are in rupee notation and are converted into sterling in this department. The printed tables of the trade of Aden are furnished by the Government of Bombay and are incorporated in this volume. The returns of the trade of the French and Portuguese Possessions in India are received from the respective Governments, and are compiled in this department for incorporation in this volume. The tables relating to the trade and shipping at each port are compiled from special annual returns furnished by the Collectors of Customs.
- (7) *The Annual Statement of the Coasting Trade and Navigation of British India* is compiled from the monthly returns which are posted into abstracts in which twelve months' figures are entered and totalled at the end of the year. The chief port tables are compiled, as for Volume II of the Foreign Seaborne Trade, from the advance proof of provincial annual statements furnished by the collectors of customs. The tables relating to the trade and shipping at each port are compiled from special annual returns.
- (8) *The Weekly Note on the Imports and Exports of Wheat, Jute, and Cotton at the Chief Ports* deals with both the seaborne and the rail and river-borne traffic. As regards the former, figures are furnished by wire by the collectors of customs except the Collector of Calcutta from whom a return is received in manuscript. The rail and river-borne trade figures are obtained from the Magistrates, Howrah and 24-Parganas, the Port Commissioners, Canal Supervisor, and the General Traffic Managers, East Indian Railway, Bengal Nagpur Railway, and Eastern Bengal Railway, and steamer companies.

18. Foreign Seaborne Trade.

It may be noted that the seaborne trade returns (so far as the list of articles, and the specification of sub-heads are concerned) are revised annually in the light of applications received from traders, etc. The Director-General of Commercial Intelligence is ordinarily consulted, and chambers of commerce are also consulted, when necessary.

19. Frontier Trade.

Section 8 deals with the trade across the land frontier of British India. The returns are furnished monthly by local authorities of Sind, the North-West Frontier Province, Kashmir,

the Punjab, the United Provinces, Bihar and Orissa, Bengal, Assam, and Burma. They are consolidated in this department. The quantity is stated in maunds which are converted into hundredweights before publications in the monthly accounts relating to the trade by land of British India with foreign countries. Formerly these accounts published progressive figures only, but since April, 1915, monthly figures, as well as progressive figures for months, have been published, as in the monthly seaborne trade accounts of British India.

20. *Agricultural Statistics, including those relating to Crop Forecasts, etc.*

Section 9 deals with agricultural statistics, including those relating to crop forecasts and cotton press returns. (These statistics, except the last mentioned, were compiled in the Department of Revenue and Agriculture until 1895, when they were transferred to the then newly created Statistical Bureau under the Director General of Statistics.)

The following publications are compiled in this section :—

- (1) Forecasts of Crops (rice, wheat, cotton, linseed, rape and mustard, sesamum, groundnut, indigo, and sugarcane). Twenty-five separate forecasts are issued annually.
- (2) Area and Yield of Crops.
Preliminary statement of area and yield of principal crops.
- (3) Agricultural Statistics of India.
Volume I.—British India.
Volume II.—Native States.
Summary Tables.
- (4) Report on the Production of Tea.
- (5) Half-monthly Cotton Press Returns.

21. *Agricultural Statistics, including those relating to Crop Forecasts, etc.*

- (1) The Provincial Departments of Agriculture furnish periodically forecasts of crops * * No. of reports.
as shown in the list (Appendix III). They are scrutinised, tabulated, consolidated, and issued as General Memoranda on Crops, of which the number is 25
during the year. To settle discrepancies, correspondence is frequently carried on with local authorities. The forecasts are published in the Supplement to the *Gazette of India* † and in the *Indian Trade Journal* ‡. The chambers of commerce are furnished with them as soon as published, if they ask for the information by prepaid telegrams.

The question of improvements of forecasts from time to time is also taken up and decided after consultation with local authorities and with the approval of the Government of India in the Department of Revenue and Agriculture.

- (2) For the compilation of Area and Yield of Crops figures are abstracted from the final General Memoranda on Crops. Introductory notes are annually revised by this department and explanatory foot-notes by provincial authorities. Certain tables, such as the yield per acre, rainfall, area and yield of minor crops, for which no forecast is prepared, are compiled in this department from different sources.

A preliminary statement of Area and Yield of principal crops is published in advance of the volume, as soon as final forecasts of all crops are issued.

- (3) The Returns of Agricultural Statistics relate to area, classification of area, area under crops, livestock, land revenue assessment, and transfers of land, and are furnished by the Provincial Agricultural Departments and Political Officers in Native States. The returns are scrutinised, consolidated, and published in the annual volumes. The appendices contain average yield per acre of crops, changes in district boundaries, a list of vernacular terms, and an alphabetical list of crops. The explanatory foot-notes are annually revised by provincial authorities and the introductory report is drawn up in this department.

A set of summary tables is compiled in advance of the annual volumes and is published separately, as is done by the Board of Agriculture for England and Wales.

- (4) The Report on the Production of Tea is compiled from returns furnished by provincial authorities. Figures regarding prices, wages, capital, and imports and exports both by land and by sea are compiled in the respective sections of this department.

- (5) Half-monthly Cotton Press Returns were introduced with effect from September 1914, but they were not published until September 1915. The object is to check the estimates of outturn as published in the cotton forecast, especially at the instance of the International Federation of Master Cotton Spinners' Association, Manchester. The returns are compiled from statements furnished by Provincial Directors of Agriculture in British Provinces and from original returns collected by the Bombay Chamber of Commerce from presses and mills in Native States. On receipt of local returns they are examined and consolidated into a half-monthly return for publication in the *Gazette of India* † and in the *Indian Trade Journal* ‡. † Appendices X and XIX. (Not printed.)

22. *Agricultural Statistics including those relating to Crop Forecasts, etc.*

This section, in addition to unofficial references from the Revenue and Agriculture Department, is engaged from time to time on special enquiries, *e.g.*, on that relating to the Census of Agricultural Production or the valuation of the gross agricultural produce in British India.

23. *Statistics relating to Commerce and Industry, and Finance (Statistics of British India, Volumes I and II, etc.).*—Section 10 deals with the undermentioned reports and abstracts:—

- (1) Statistics of British India, Volume I—Commercial.
- (2) " " " Volume II—Financial.
 Part I—Mint, Currency, Public Debt, etc.,
 Part II—Principal Heads of Revenue.
- (3) Monthly Statistics of Cotton Spinning and Weaving in Indian mills.
- (4) Statistical Tables relating to Banks in India.
- (5) Ditto Joint Stock Companies in British India and Mysore.
- (6) The Report on the Production and Consumption of Coal in India.
- (7) A list of Factories and other Large Industries.

(Parts I to IV of
the 6th Issue.)

24. *Statistics relating to Commerce and Industry, and Finance (Statistics of British India, Volumes I and II, etc.).*

*Appendix VI.

† Post Office, Tele-
graphs, Industrial
Census, Coal Mines,
and Joint Stock
Companies.
‡ Railways, Irriga-
tion, and Mineral
Production.

§ Registered Debt,
Co-operative Societies
and Forests.

- (1) *Statistics of British India.*—Volume I (Statistical Abstract) contains 18 sections as shown in the office calendar (page 44).^{*} Of these 18 sections, actual compilation of local returns is necessary for 10 sections⁽¹⁾, 5 sections[†] are reproduced from departmental reports and other publications of this Department, and the other three[‡] are partly compiled in this department and partly reproduced from departmental reports. Seven sections relate to the calendar year and the remainder to the official year.
- (2) Volume II of Statistics of British India (Statistical Abstract) contains two parts, namely, Part I which includes statistics relating to Revenue and Expenditure, Coinage and Currency, Registered Debt, Council Bills, Ways and Means, Prices of gold and silver and Exchange, Military Services, Banks, Co-operative Societies, and Life Assurance; and Part II including the principal heads of revenue such as Land Revenue, Forests, Opium, Salt, Stamps, Excise, Provincial Rates, Customs, Income Tax, Tributes from Native States, and Interest Receipts. The former contains 13 sections and the latter 11 sections. Of these 24 sections, 11 sections⁽²⁾ are compiled from departmental reports such as Finance and Revenue Accounts of the Government of India and Home Accounts of the Government of India and other sources; actual compilation is made for 10 sections⁽³⁾ from returns obtained from local authorities and other Departments such as the Controller of Currency, the Northern India Salt Revenue, the Mints, etc. Three sections[§] are partly compiled in this department and partly obtained from departmental reports. Only two sections relate to the calendar year, and the remaining sections generally to the official year.
- (3) The Monthly Statistics of Cotton Spinning and Weaving in Indian Mills are compiled from returns furnished by local authorities. Besides the quantity of yarn spun and woven goods produced, the excise duty collected in each month is also published.⁴
- (4) Statistical Tables relating to Banks in India are also published separately with details obtained from the presidency and joint stock banks in India and for the exchange banks from returns received through the India Office.
- (5) Statistical Tables relating to Joint Stock Companies in British India and Mysore are compiled from returns and reports furnished by Provincial Registrars. The Companies are classified according to the nature of their business, and a detailed list of all the Companies (showing capital, date of registration, and objects of each) is also included with an index.
- (6) The Report on the Production and Consumption of Coal in India is based on returns obtained from the Chief Inspector of Mines and the Director, Geological Survey of India, and also from non-official sources such as steamer companies, mills, iron and brass foundries, etc. Statistics of certain foreign countries are also obtained from Colombo, Singapore, and Yokohama. Figures of prices, freights, capital of coal companies, and imports and exports are compiled in the respective sections of this department.
- (7) The Detailed List of Factories and other Large Industries is compiled from returns furnished by local authorities and those obtained through Provincial Inspectors

(1) Factories and other large Industries, Breweries, Cotton mills, Jute mills, Paper mills, Woollen mills, Patents and Designs, Foreign Trade and Shipping, Wrecks, and Merchandise Marks.

(2) Revenue and Expenditure, Enfranchised securities, Military Services, Savings Banks, Banks, Life Assurance, Land Revenue, Provincial Rates, Customs Revenue, Tributes from Native States, and Interest receipts.

(3) Mint and Coinage, Paper Currency, Council Bills, Ways and Means, Prices, Opium, Salt, Stamps, Excise, and Income Tax.

(4) Another table showing the form value of Cotton Goods woven in the mills has been added with effect from April 1917.

of Factories. The list shows the name and locality of each industrial concern and the average daily number of persons employed, and is classified according to articles manufactured. Factories owned by Government and local bodies are kept separate from those owned and worked by Companies and individuals.

- (8) A note with statistical tables on the working of the Indian Factories Act in the various Provinces, etc. This is forwarded by the Government of India to the Secretary of State.

25. *The work of the Department as compared with similar work at the Board of Trade.*—It will be seen from paragraphs 2 to 24 that the work of the Department of Statistics differs in a large degree from similar work at the Board of Trade. In the United Kingdom there is no central Department of Statistics. The Board of Trade, however, is the office concerned with general statistical work probably more than any other. Several departments of Government prepare and publish statistical information dealing with matters falling within the scope of their respective functions, *e.g.*, the Board of Customs and Excise publishes statistics of imports and exports (in consultation with the Board of Trade); the Board of Agriculture and Fisheries, the agricultural statistics of England and Wales, corn sales and prices; the Local Government Board, statistics relating to local Government, local taxation and expenditure, pauperism, etc.; the Home Office, statistics relating to mines and minerals, factory statistics, criminal and judicial statistics, etc.; the Board of Inland Revenue, statistics relating to general revenue matters, *i.e.*, income tax, house duty, stamps, estate duty; the Lunacy Commissioners, statistics relating to lunatic asylums; the Board of Education, statistics relating to educational matters; the General Register Offices of England and Wales, Scotland, and Ireland, the periodical census, statistics of population, births, deaths, and marriages. The compilation of statistical abstracts at the Board of Trade is, therefore, a much easier task than that of the central Statistical Department in this country. The Department of Statistics has not only to compile the "all-India" figures from provincial or local figures but has to digest, summarise, re-arrange, and in many cases to convert statistical data. Following the principle of the Labour Statistics Department of the Board of Trade and Statistical Departments in other countries, the office has been, as already pointed out, divided into sections. Each section is familiar with the compilation and handling of the statistics relating to its section. This is of great advantage, provided that the sections are sufficiently strong, and that the heads of the sections are capable experts. The work of the department was established on a solid foundation by Mr. J. E. O'Connor from 1895 to 1902, and at the present time we are attempting to build a structure of growing usefulness to domestic and foreign commerce on this foundation. There is, however, an imperative need to strengthen the sections and especially the supervising staff if the statistics are to be published quicker and interpreted to a greater extent than is at present possible. From the 1st April to date (December 1916) no less than 200 publications, in addition to replies to queries, a selection of which is given in Appendix VII, have been issued from the department, and these have to be seen by the Director himself as there are no Assistant Directors or Gazetted Officers in the department. It is also necessary for the head of the office to visit (as at present), when occasion arises, the principal commercial cities. By this means he is able to discuss and settle, in personal communication with local Government officials (especially Directors of Agriculture, Land Records, and Industries and also Collectors of Customs) and non-official bodies and individuals, the diverse and sometimes complicated questions, that arise in connexion with statistical investigation, the treatment of Indian economic facts, and especially trade questions, *e.g.*, in regard to cotton returns, wheat forecasts, etc. Corresponding with the expansion and growing complexity of commercial and industrial conditions, there is and must be the inevitable tendency to expansion in all the work of the department, and it is proposed to submit to Government, after the present financial stringency, a scheme for increasing the efficiency, as far as practicable, of the office.

26. *Speed and accuracy of trade statistics in general.*—Some of the publications of the department have to be brought out with the greatest possible rapidity. This applies especially to trade publications. Promptness is, without question, the first requirement in the case of the Monthly Customs Revenue Return, the Monthly Accounts of Exports and Imports, and Crop Forecasts. On the other hand, there are publications, such as Statistical Abstracts, which do not require to be so strictly up to date. The main object of Statistical Abstracts is that they should cover as wide a field as possible, and that the statistics should be comparable over fairly long periods of time. We may agree with Dr. Farr, in regard to these publications, who said in his "Vital Statistics"—1885—(when referring to his annual Statistical Volumes): "It is important that they (Statistical reports) should be *done well*.... It is desirable only in the next degree that they should be *done quickly*." Speed and accuracy of statistics in general are both desirable things; which is the more important depends on the purpose for which the particular statistical data are used. Appendix VI shows the dates on which the various returns are ordinarily published. It may also be possible to introduce gradually, in this department, mechanical methods of tabulation, which would increase the timeliness as well as the accuracy of the returns. The introduction of tabulating machines eliminates much clerical labour, which permits a more careful scrutiny of the returns and thus insures a higher degree of accuracy. The introduction of such machines has, it is believed, been successful in the case of the International Institute of Agriculture, Rome, and also the New York Custom House.

27. *Statistics of Labour*.—Statistics of wages paid in the important industries, etc., are, as already pointed out, very meagre. The question of collecting statistical information by simple forms is under the consideration of Government. Millowners, district officers, etc., will readily fill in forms, while they delay in answering circular letters requesting statistics when such letters are unaccompanied by forms.

28. *Instructions issued to compilers*.—Handbooks containing instructions on the collection of statistics relating to forecasts, sea-borne trade, domestic commerce or inland trade, are issued to local authorities. This has been found to be of considerable assistance to local authorities in the collection of the various returns.

II.—THE DISTRIBUTION OF THE STATISTICS.

*Appendix V.

29. *Distribution of Statistics*.—A statement * has been prepared to show the distribution of the publications of the department (1) in India and (2) abroad. It will be seen from the statement that the total number of copies distributed is 13,054, of which 9,711 copies, or 74 per cent. are distributed in India. The distribution noted in this statement against the quarterly, monthly, fortnightly, weekly, and periodical forecasts represents the number of copies distributed of one issue of each only. The statement also excludes the number of copies kept for sale by Superintendent, Government Printing. Government officers in India receive 5,807 or 44 per cent.; the commercial community, including chambers of commerce and firms, 1,131 or 9 per cent.; newspapers and public institutions 1,961 or 15 per cent.; and the balance 812 copies, or 6 per cent.; are distributed to Native States and Foreign Consuls in India.

† Appendices XI, XIII, and XVII (Not printed.)

30. A list of the publications of the department printed during each quarter is published in the "Gazette of India" † and Gazettes of Local Governments, and in the "Indian Trade Journal" †. Newspapers, especially commercial papers such as "Capital," "Commerce," etc., quote from the publications. The circulation is in reality greater than that shown in the statement of distribution, because much of the work done is largely obtained by traders and others through quotation. The distribution, therefore, is not altogether a good index of the demand for the information published by the department. The information, however, does not appear always to be known even to district officers as the correspondence (Appendix I) will show. We have sometimes been asked by firms and chambers to telegraph information such as that relating to the forecasts, but under the orders of Government we cannot telegraph at Government's expense to public bodies and associations or to private firms.

31. We do not at present have, as the Labour Statistics Department of the Board of Trade has, a gazette by which we could publish monthly the statistics which have been compiled. The gazette of the Labour Statistics Department of the Board brings out, on 15th of every month, statistics which have been compiled up to the 13th. The statistics are explained in very readable notes, and the information in the gazette is of a kind that ordinarily requires working up. The gazette is full, up to date, useful, interesting, and anything but a melancholy print. It is well printed and illustrated with charts or diagrams. It bears the impress of a sharp intelligence, and does not contain any obsolete extracts from random reports. At the present time, thanks to the courtesy of the Director-General of Commercial Intelligence, we use a comparatively large part of the "Journal" as a means of making known our most recent returns. The "Board of Trade Journal" also refers to the publications of this department from time to time in its list of Foreign and Colonial Publications, and in the body of the Journal itself and this is for the benefit of importers, manufacturers, etc., in the United Kingdom.

32. In connexion with the distribution of information, it may be noted that we send by post and telegraph information on forecasts, exports and imports, agricultural produce, etc., to the International Institute of Agriculture, Rome, which publishes the statistics in its monthly bulletin of Agricultural and Commercial Statistics. We also forward to the Revenue and Statistics Department at the India Office in addition to tables, etc., for the India Office abstract monthly reports on the prospects of certain staple commodities. This, however, is in all probability only a temporary measure during the continuance of the war.

‡ Appendix II.

33. The circulation of the department's publications‡ might be increased by a more extensive system of advertisement, e.g., in Government Gazettes, etc., where the publications published during the week might be given. The suggestion has already been made, in the Memorandum on Commercial Intelligence, of obtaining from chambers of commerce the names of firms with a view to sending gratis copies of certain publications for a short period, together with a circular letter that it is hoped that they may become subscribers. The circulation might also be increased (1) by placing the publications in the hands of booksellers and requesting them to advertise them in their regular advertisements of new books and (2) by a system of one annual subscription to firms which would cover all the purely trade publications, e.g., the monthly and annual trade Reviews, the weekly, monthly, and annual returns of exports and imports, crop forecasts, etc. The "Board of Trade Journal," it may be noted, notices weekly our publications in its list of 'publications received' and this results in enquiries from firms in the United Kingdom. Firms in the United Kingdom either direct or through their agents in India might also become subscribers on the basis of an inclusive annual subscription. By increasing the number of trade papers on our free mailing list greater notice might be taken of some of the returns at present published

by the department. The methods of the United States of America and German Governments may be followed as far as practicable. It would, for example, be possible to issue postcards * to firms, of cotton press returns and of forecasts in which the firms are interested. * Appendix IV. We might be able, as a *quid pro quo*, to obtain statistics of wages and other industrial statistics. When the pressure of war work is over, the question of increased distribution will be considered. It will be seen from the statement of distribution of publications that the distribution, although capable of extension, is on the whole a wide and even generous distribution.

Appendix I.

Copy of a demi-official letter from a District Officer to the Director General of Commercial Intelligence.

Can you tell me whether any information is distributed to district officers regarding the average prices of principal commercial commodities such as hides, bones, etc., in the course of the year. I cannot find anything in my library except what relates to food grains and other food stuffs. I have just had an Income Tax Appeal in which such information would have been of great value, and I should imagine that other cases will probably arise. Perhaps you might consider whether anything can be done in this matter, though I may be mistaking your functions for the functions of the Director of Statistics.

Copy of a demi-official letter to the Director of Statistics.

Your demi-official No. 1255, dated the 8th May.

I must apologise for not having thanked you before for your letter and the mass of material sent with it. It was very kind of you to take all this trouble.

I have really delayed answering your letter till I had a little more experience of what District Offices really want. I am afraid my views are still somewhat nebulous. I think the first requisite is a very brief pamphlet showing what statistical information regarding trade matters is available and where. I do not know whether you have the leisure or inclination to prepare this but I am sure it might be made very valuable. If one knew where one could get information on a particular point it would be worth while to write for it, if it were not available in one's own office. At present the difficulty for officers in districts, somewhat out of the ordinary course of trade, is that when they are called on to furnish information or require it for their own purposes they do not know how to start about getting it. These are merely my impressions after less than three months of the district work and I would certainly recommend that you should verify them, when you get the opportunity, with the views of more experienced district officers.

Appendix II.

Publications of the Department of Statistics, India.

These publications are obtainable from the Superintendent, Government Printing, India, Calcutta. Remittances should be made by postal money order and should include forwarding charges, as indicated in brackets opposite each publication.

ANNUAL.

1. Review of the Trade of India. As. 12. (2a.)
2. Accounts relating to the Sea-borne Trade of British India for the Calendar year. As. 8. (2a.)
3. Annual Statement of the Foreign Sea-borne Trade and Navigation of British India—
Vol. I.—Abstract and detailed Tables of Imports and Exports. R4. (R1.)
Vol. II.—Abstract and detailed Tables of Trade and Shipping with each country and at each Port; and the Tables relating to the trade of Aden and of the French and Portuguese Possessions of India. R4-12. (12a.)
4. Annual Statement of the Coasting Trade and Navigation of British India. R3. (7a.)
5. Inland Trade (Rail and River-borne) of India. R1-12. (6a.)
6. Report on the Trade carried by Rail and River in Bengal. R3-3. (5a.)*
7. Report on the Trade of Bengal with Nepal, Tibet, Sikkim, and Bhutan. As. 13. (2a.)*
8. Prices and Wages in India. R2. (9a.)
9. Statistical Abstract for British India.—Vol. I.—Commercial Statistics. R1-8.
10. " " Vol. II.—Financial Statistics R1-8.
11. " " Vol. III.—Public Health. R1.
12. " " Vol. IV.—Administrative, Judicial, etc. R1-4.
13. " " Vol. V.—Education. R1-6.

(NOTE.—Those marked with an asterisk (*) to be obtained from the officer in charge, Bengal Secretariat Book Depot.)

14. Agricultural Statistics of India—
Vol. I.—British India. R2-8. (12a.)
Vol. II.—Native States. R1. (4a.)
15. Summary Tables of the Agricultural Statistics of British India. As. 4.
16. Estimates of Area and Yield of Principal Crops in India. As. 8. (2a.)
17. Preliminary Statement of Area and Yield of Principal Crops in India, one-half anna ($\frac{1}{2}$ anna).
18. Report on the production of Tea in India. As. 8. (2a.)
19. Report on the production and consumption of Coal in India. As. 8. (2a. 6p.)
20. Statistics relating to Joint Stock Companies in British India and Mysore. R3. (2a.)
21. Variations in Indian Price Levels from 1861 expressed in Index Numbers. As. 12 (3a.)
22. Statistical Tables relating to Banks in India with an Introductory Memorandum. As. 4.

HALF-YEARLY.

23. Increase or decrease in the Capital of Companies incorporated in India and registered under the Indian Companies act. Half-anna.

QUARTERLY.

24. Inland Trade (Rail and River-borne) of India. As. 8. (2a.)
25. Rate List (of stores purchased in England for Government Departments in India. As. 8.

MONTHLY.

26. Accounts of the Foreign Sea-borne Trade and Navigation of British India. As. 8. (2a.)
27. Review of the Sea-borne Trade and Navigation of British India. As. 4.
28. Accounts relating to the Trade by land of British India with foreign countries. As. 8. (2a.)
29. Statistics of Cotton Spinning and Weaving in Indian Mills. As. 2. (1a.)
30. Trade Fluctuations in selected articles. Anna 1 and pies 6.
31. Calcutta Trade Fluctuations. As. 2.
32. Customs Revenue Statement. Half-anna.
33. Joint Stock Companies registered in British India and Mysore. Half-anna.

FORTNIGHTLY.

34. Wholesale and Retail Prices of cereals, pulses, oilseeds, sugar, salt, etc., in India. As. 6.
35. Wholesale and Retail Prices of wheat in India. Anna 1 and pies 6.
36. Cotton Press Returns. Half-anna.

WEEKLY.

37. Weekly Imports and Exports from Chief Ports of wheat, jute, and cotton. Half-anna.

MISCELLANEOUS.

38. Memorandum and Statistical Tables relating to the Trade of India with Germany and Austria-Hungary. As. 8. (2a.)
39. List of Factories and other Large Industries in India. R3-12.
40. Statistical Tables showing for each of the years 1901-02 to 1913-14 the estimated value of imports and exports at the prices prevailing in 1899-1900 to 1901-02. As. 8.
41. Memorandum and Statistical Tables relating to Prices and Freights in India since the outbreak of War. R2-8.
42. Crop Forecasts. Half-anna each.

43. Return showing the Imports and Exports of merchandise by sea, from and to foreign countries. Pies 6.
44. Prices and Freights during the first year of War. As. 12.
45. Trade of Indian ports in the first year of War. As. 2.
46. Registration and publication of Statistics relating to the Sea-borne Trade and Navigation of British India. Rs-2.
47. Return showing the Imports and Import duty collected during the first year of War. As. 12.
48. Statistical Tables relating to wheat. As. 13.
49. Imports into British India of motor cars, tyres, etc. Half-anna.
50. A manual on the preparation of crop forecasts in India. As. 8.
51. Export trade of British India with certain neutral countries. Half-anna.

**Agents for the Sale of Books published by the Superintendent of Government
Printing, India, Calcutta.**

IN EUROPE.

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IN INDIA AND CEYLON.

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| The Indian School Supply Depot, 309, Bow Bazar Street, Calcutta, and 226, Nawabpur, Dacca. | Rai Sahib M. Gulab Singh & Sons, Mufid-i-Am Press, Lahore and Allahabad. |
| Butterworth & Co. (India), Ltd., Calcutta. | Rama Krishna & Sons, Lahore. |
| Rai M. C. Sarcar Bahadur & Sons, 90-2 A, Harrison Road, Calcutta. | Supdt., American Baptist Mission Press, Rangoon. |
| The Weldon Library, 18-5, Chowringhee Road, Calcutta. | Manager, the "Hitavada," Nagpur. |
| Standard Literature Company, Limited, Calcutta. | S. C. Talukdar, Proprietor, Students and Compan Cooch Behar. |
| Lal Chand & Sons, Calcutta. | A. M. & J. Ferguson, Ceylon. |
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| D. B. Taraporevala, Sons & Co., Bombay. | |
| Mrs. Radhabai Atmaram Sagoon, Bombay. | |

* Agents for the sale of Legislative Department publications only.

Appendix III.

Dates for the transmission of Provincial Forecasts of Crops and the preparation of General Memoranda.

Forecasts of crops issued by Local Governments.						Due dates			
RICE—									
1st report:	Bengal	{	(Summer)	.	.	.	April	—	
			(Autumn)	.	.	.	September	30	
			(Winter)	.	.	.	October	15	
	Bihar and Orissa	{	(Summer)	.	.	.	April	—	
			(Autumn)	.	.	.	September	30	
			(Winter)	.	.	.	October	15	
	Assam	{	(Summer)	.	.	.	April	—	
			(Autumn)	.	.	.	September	30	
			(Winter)	.	.	.	October	15	
	Bombay	.	.	.	.	.	"	1	
Central Provinces and Berar	.	.	.	.	.	"	3		
2nd report:	Burma	.	.	.	.	.	"	15	
	Madras	.	.	.	.	.	"	15	
	United Provinces	.	.	.	.	.	"	15	
	Burma (2nd report)	.	.	.	.	.	November	15	
	Bombay	.	.	.	.	.	December	1	
	Bengal	{	(Autumn)	.	.	.	.	"	15
			(Winter)	.	.	.	.	"	15
	Bihar and Orissa	{	(Autumn)	.	.	.	.	"	15
			(Winter)	.	.	.	.	"	15
	Assam	{	(Autumn)	.	.	.	.	"	15
(Winter)			.	.	.	.	"	15	
Burma (3rd report)	.	.	.	.	.	"	15		
Madras	.	.	.	.	.	"	15		
United Provinces	.	.	.	.	.	"	15		
Central Provinces and Berar (final)	.	.	.	.	.	"	15		
Burma (4th report)	.	.	.	.	.	January	15		
3rd report:	Bengal (Winter)	.	.	.	.	February	15		
	Bihar and Orissa (Winter)	.	.	.	.	"	15		
	Assam (Winter)	.	.	.	.	"	15		
	Burma (5th report)	.	.	.	.	"	15		
	Madras	.	.	.	.	"	15		
	United Provinces	.	.	.	.	"	15		
	Bombay (Spring)	.	.	.	.	"	15		
	Coorg	.	.	.	.	"	15		

HEAT—

1st report:	Punjab	.	.	.	.	January	20
	United Provinces	.	.	.	.	"	20
	Central Provinces and Berar	.	.	.	.	"	20
	Bombay and Sind	.	.	.	.	"	20
	North-West Frontier Province	.	.	.	.	"	20
	Bengal	.	.	.	.	"	20
	Bihar and Orissa	.	.	.	.	"	20
	Ajmer-Merwara	.	.	.	.	"	20
	Delhi	.	.	.	.	"	20
	Mysore	.	.	.	.	"	20
	Hyderabad	.	.	.	.	"	20

*Forecasts of crops issued by Local Governments—contd. Due dates.*WHEAT—*contd.*

<i>1st report—contd.</i>	Central India	January	20
	Rajputana	"	20
<i>2nd report :</i>	Punjab	March	1
	United Provinces	"	1
	Central Provinces and Berar	"	1
	Bombay and Sind	"	1
	North-West Frontier Province	"	1
	Bengal	"	1
	Bihar and Orissa	"	1
	Ajmer-Merwara	"	1
	Delhi	"	1
	Mysore	"	1
	Hyderabad	"	1
	Central India	"	1
	Rajputana	"	1
<i>3rd report :</i>	Punjab	May	15
	United Provinces	"	15
	Central Provinces and Berar	"	15
	Bombay and Sind	"	15
	Bengal	"	15
	Bihar and Orissa	"	15
	Ajmer-Merwara	"	15
	Delhi	"	15
	Mysore	"	15
	Hyderabad	"	15
	Central India	"	15
	Rajputana	"	15
	North-West Frontier Province	"	22
<i>4th report :</i>	Punjab	August	1
	United Provinces	"	1
	Central Provinces and Berar	"	1
	Bombay and Sind	"	1
	Bengal	"	1
	Bihar and Orissa	"	1
	North-West Frontier Province	"	1
	Ajmer-Merwara	"	1
	Delhi	"	1
	Mysore	"	1
	Hyderabad	"	1
	Central India	"	1
	Rajputana	"	1

COTTON—

<i>1st report :</i>	Punjab	August	10
	United Provinces	"	10
	Central Provinces and Berar	"	10
	Bombay (early)	"	10
	Madras	"	10
	Burma	"	10
	North-West Frontier	"	10
	Assam	"	10
	Bengal	"	10
	Bihar and Orissa	"	10

Forecasts of crops issued by Local Governments—contd.

Due dates.

COTTON—contd.

1st report—contd.	Ajmer-Merwara	August	10
	Hyderabad	"	10
	Rajputana	"	10
	Central India	"	10
	Mysore	"	10
2nd report:	Punjab	October	10
	United Provinces	"	10
	Central Provinces and Berar	"	10
	Bombay	"	10
	Madras	"	10
	Burma	"	10
	North-West Frontier	"	10
	Assam	"	10
	Bengal	"	10
	Bihar and Orissa	"	10
	Ajmer-Merwara	"	10
	Hyderabad	"	10
	Rajputana	"	10
	Central India	"	10
	Mysore	"	10
3rd report:	Punjab	December	10
	United Provinces	"	10
	Central Provinces and Berar	"	10
	Bombay	"	10
	Madras	"	10
	Burma	"	10
	North-West Frontier	"	10
	Assam	"	10
	Bengal	"	10
	Bihar and Orissa	"	10
	Ajmer-Merwara	"	10
	Hyderabad	"	10
	Rajputana	"	10
	Central India	"	10
	Mysore	"	10
4th report.	Punjab	February	10
	United Provinces	"	10
	Central Provinces and Berar	"	10
	Bombay	"	10
	Madras	"	10
	Burma	"	10
	North-West Frontier	"	10
	Assam	"	10
	Bengal	"	10
	Bihar and Orissa	"	10
	Ajmer-Merwara	"	10
	Hyderabad	"	10
	Rajputana	"	10
	Central India	"	10
	Mysore	"	10

LINSEED, RAPE AND MUSTARD—

1st report:	Punjab (rape and linseed)	December	20
	United Provinces (rape and linseed)	"	20

*Forecasts of crops issued by Local Governments—contd. Due dates.*LINSEED, RAPE AND MUSTARD—*contd.*

<i>1st report—contd.</i>	Bengal	December	20
	Bihar and Orissa	"	20
	Assam	"	20
	Central Provinces and Berar (linseed)	"	20
	Bombay (rape and linseed)	"	20
	North-West Frontier (rapeseed)	"	20
	Hyderabad (all oilseeds)	"	20
	Madras (castor)	January	—
<i>2nd report:</i>	Punjab (rape and linseed)	March	1
	United Provinces (rape and linseed)	"	1
	Bengal	"	1
	Bihar and Orissa	"	1
	Assam	"	1
	Central Provinces and Berar (linseed)	"	1
	Bombay (rape and linseed)	"	1
	North-West Frontier (rapeseed)	"	1
	Hyderabad (all oilseeds)	"	1
<i>3rd report:</i>	Punjab (rape and linseed)	May	15
	United Provinces (rape and linseed)	"	15
	Bengal	"	15
	Bihar and Orissa	"	15
	Central Provinces and Berar (linseed)	"	15
	Bombay (rape and linseed)	"	15
	North-West Frontier (rapeseed)	"	32

SESAMUM (*til* or *jinjili*)—

<i>1st report:</i>	Bengal (early crop)	July	31
	Bombay	August	15
	Madras	"	15
	Central Provinces and Berar	"	15
	United Provinces	"	15
	Punjab	"	15
	Ajmer-Merwara	"	15
	Bihar and Orissa (2nd report—early crop)	"	15
<i>2nd report:</i>	Bombay	October	15
	Madras	"	15
	Central Provinces and Berar	"	15
	United Provinces	"	15
	Punjab	"	15
	Ajmer-Merwara	"	15
	Bihar and Orissa (1st report—late crop)	"	15
<i>3rd report:</i>	Hyderabad	December	20
	Bengal (late crop)	"	31
	Bombay	January	1
	Central Provinces and Berar	"	1
	United Provinces	"	1
	Punjab	"	1
	Ajmer-Merwara	"	1
	Bihar and Orissa (2nd report—late crop)	"	1
	Madras	"	12

Forecasts of crops issued by Local Governments—contd. Due dates.

SESAMUM—*contd.*

4th report:	Hyderabad	March	1
	Madras	April	15
	Bihar and Orissa (1st report—early crop)	„	15

GROUNDNUT—

1st report:	Burma	August	10
	Bombay	„	15
2nd report:	Burma	October	10
	Bombay	„	15
	Madras (1st report)	„	15
	Burma (3rd „)	December	10
3rd report:	Bombay	January	15
	Burma (4th report)	February	10
	Madras (2nd „)	„	10

INDIGO—

1st report:	Madras	September	15
	Bengal	„	30
	Bihar and Orissa	„	30
	United Provinces	October	1
	Bombay	„	1
	Punjab	„	15
2nd report:	Bombay	December	1
	Madras	„	15
	Bengal	„	15
	Bihar and Orissa	„	15
	United Provinces	„	15
	Punjab	„	20

SUGARCANE—

1st report:	Bengal	August	15
	Madras	„	15
	Assam	„	15
	Bihar and Orissa	„	15
	United Provinces	„	15
	Punjab	„	15
	North-West Frontier Province	„	15
	Bombay	„	15
	Central Provinces and Berar	„	15
2nd report:	United Provinces	October	15
	Punjab	„	15
	North-West Frontier Province	„	15
	Madras	„	15
	Bombay	„	15
	Central Provinces and Berar	„	15
	Bengal	„	15
	Bihar and Orissa	„	15
	Assam	„	15
3rd report:	Bengal	January	31
	Assam	„	31
	Bihar and Orissa	„	31

*Forecasts of crops issued by Local Governments—concl'd. Due dates.*SUGARCANE—*cont'd.*

3rd report—cont'd.	Madras	January	31
	Bombay	"	31
	Central Provinces and Berar	"	31
	Punjab	"	31
	United Provinces	February	16
	North-West Frontier Province	"	16

JUTE—

1st report :	Bengal	July	7—15
	Assam	"	7—15
	Bihar and Orissa	"	7—15
2nd report :	Bengal	September	21
	Assam	"	21
	Bihar and Orissa	"	21

General Memoranda by the Department of Statistics.

RICE—

1st	October	20
2nd	December	20
Final	February	20

WHEAT—

1st	January	31
2nd	March	15
3rd	May	30
Final	August	10

COTTON—

1st	August	15
2nd	October	15
3rd	December	15
Final	February	15

LINSEED, RAPE AND MUSTARD (*winter oilseeds*)—

1st	January	1
2nd	March	15
Final	June	1

SESAMUM (*til ar jinji*)—

1st	September	1
2nd	October	20
Final	January	15
Supplementary	April	—

GROUNDNUT—

1st	October	20
Final	February	15

INDIGO—

1st	October	15
Final	December	20

SUGARCANE—

1st	August	20
2nd	October	20
Final	February	16

Appendix IV.

[THIS WAS PUBLISHED ON A POSTCARD.]

PRELIMINARY REPORT

8—4801

DEPARTMENT OF COMMERCE.

BUREAU OF THE CENSUS.

SAM. L. ROGERS, DIRECTOR.

Washington, 10 A.M., September 8, 1916.

REPORT ON COTTON GINNING.

Number of bales of cotton ginned from the growth of 1916 prior to September 1, 1916, and comparative statistics to the corresponding date in 1915, 1914, and 1913.

STATE.	YEAR.	COUNTING ROUND AS HALF BALES.	STATE.	YEAR.	COUNTING ROUND AS HALF BALES.
UNITED STATES	1916	850,032	NORTH CAROLINA	1916	289
	1915	463,883		1915	354
	1914	480,317		1914	968
	1913	799,099		1913	177
ALABAMA	1916	22,373	OKLAHOMA	1916	7,777
	1915	38,925		1915	8
	1914	46,241		1914	238
	1913	44,562		1913	5,106
ARKANSAS	1916	14,761	SOUTH CAROLINA	1916	26,765
	1915	270		1915	4,305
	1914	521		1914	14,633
	1913	1,293		1913	7,264
CALIFORNIA	1916	443	TENNESSEE	1916	120
	1915	99		1915	2
	1914	1,205		1914	26
	1913			1913	9
FLORIDA	1916	2,881	TEXAS	1916	522,008
	1915	4,701		1915	271,328
	1914	5,214		1914	268,485
	1913	2,960		1913	655,871
GEORGIA	1916	212,754	ALL OTHER STATES	1916	
	1915	133,408		1915	6
	1914	136,286		1914	28
	1913	72,352		1913	4
LOUISIANA	1916	29,780	The statistics in this report include 26,935 round bales for 1916, 8,947 bales for 1915; 356 for 1914; and 7,610 for 1913. The number of sea-island bales included is 4,631 for 1916; 2,097 for 1915; 1,748 for 1914; and 436 for 1913. The distribution of the sea-island cotton for 1916, by states, is Florida, 760; Georgia, 3,871; and South Carolina, none. The statistics of this report for 1916 are subject to slight corrections when checked against the individual returns of the ginners being transmitted by mail.		
	1915	5,858			
	1914	3,783			
	1913	7,449			
MISSISSIPPI	1916	10,081			
	1915	4,619			
	1914	2,689			
	1913	2,052			

CONSUMPTION, STOCKS, IMPORTS, AND EXPORTS—UNITED STATES.

Cotton consumed during the month of July, 1916, amounted to 489,933 bales. Cotton on hand in consuming establishments on July 31 was 1,632,456 bales, and in public storage and at compresses 1,090,914 bales. The number of active consuming cotton spindles for the month was 32,267,902. The quantity of cotton consumed for the twelve months ending July 31, was 6,395,972 bales; the total imports for the month of August, 1916, was 7,503 bales and the exports of domestic cotton, including linters, was 405,567 bales.

WORLD STATISTICS.

The world's production of commercial cotton, exclusive of linters, grown in 1915, as compiled from published reports, documents, and correspondence, was approximately 18,559,000 bales of 500 pounds net. The consumption of cotton (exclusive of linters in the United States) for the year ending July 31, 1915, was approximately 19,761,000 bales of 500 pounds net. Except for the United States, cotton included in this amount refers largely to that used in spinning. The total number of producing cotton spindles both active and idle is about 147,500,000.

APPENDIX V.

Appendix

Statement showing the number of copies of the publications

[This list excludes occasional publications and copies sold

Publications.	COUNTRIES OUT OF INDIA										
	UNITED KINGDOM.			EUROPE (CONTINENT).			AMERICA.			COLONIES.	
	Government Departments.	Institutions, Libraries, etc.	News-papers.	Government Departments.	Institutions, Libraries, etc.	News-papers.	Government Departments.	Institutions, Libraries, etc.	News-papers.	Government Departments.	Institutions, Libraries, etc.
<i>Annual.</i>											
1. Review of the Trade of India .	857*	20	18	19	...	3	4	6	1	18	7
2. Accounts relating to the Sea-borne Trade of British India for the calendar year.	21	16	6	16	...	...	9	1	1	14	8
3. Annual statement of the Foreign Sea-borne Trade of British India, Volumes I and II.	37	17	3	16	...	1	9	8	...	14	3
4. Annual statement of the Coast-ing Trade.	30	4	1	6	...	...	2	2	...	1	...
5. Inland Trade (Rail and River borne) of India.	27	11	6	1	...	...	6	2	...	11	2
6. Report on the Trade carried by rail and river in Bengal.	16	1	...	...	...	...	1	1	...	1	...
7. Report on the Trade of Bengal with Nepal, Tibet, Sikkim and Bhutan.	16	1	...	...	...	...	1	1	...	...	...
8. Prices and Wages in India .	37	15	5	11	1	...	13	...	...	6	2
Statistics of British India—											
9. Volume I—Commercial .	49	15	6	13	...	1	10	9	1	9	7
10. " II—Financial .	46	14	4	10	...	...	8	7	1	10	4
11. " III—Public Health .	42	14	4	10	...	1	7	7	1	8	4
12. " IV—Administ r a-	49	14	4	12	...	1	8	8	1	9	5
tive, Judicial, etc.											
13. Volume V—Education .	48	13	5	11	...	1	9	7	1	9	4
14. Agricultural Statistics—											
Volume I—British India .	45	17	4	9	...	...	17	1	1	22	1
" II—Native States .	45	17	4	9	...	...	17	1	1	22	1
15. Estimates of Area and Yield of principal Crops in India.	28	1	3	7	...	...	6	2	...	4	...
16. Report on the production of Tea in India.	42	15	11	13	...	3	8	...	1	13	...
17. Report on the production and consumption of Coal in India.	27	1	3	6	1	...	6	...	...	2	...
18. Statistics relating to Joint Stock Companies in British India and Mysore.	23	2	2	...	...	...	2	...	...	...	...
19. Variations in Indian Price Levels from 1861 expressed in Index numbers.	80	14	3	8	...	...	6	5	...	5	1
20. Statistical Tables relating to Banks in India, etc.	46	13	6	10	...	1	7	9	1	9	6
<i>Quarterly.</i>											
21. Inland Trade (Rail and River-borne) of India.	27	11	6	1	...	...	6	2	...	11	2
<i>Monthly.</i>											
22. Accounts of the Foreign Sea-borne Trade and Navigation of British India.	21	16	6	16	...	...	9	1	1	14	3
23. Review of the Sea-borne Trade and Navigation Accounts of British India.	11	3	8	1	...	...	...	...	...	...	...
24. Accounts of the Trade by Land with Foreign Countries.	14	1	5	2	...	...	3	2	...	...	1
25. Statistics of cotton spinning and weaving in Indian Mills.	12	4	5	11	...	...	7	2	...	9	...
26. Trade Fluctuations in selected articles.	8	...	6	...	...	...	1	...	...	...	...
27. Customs Revenue Statement .	1	...	2	...	...	...	...	...	...	...	...
<i>Fortnightly.</i>											
28. Statement of wholesale and retail prices of food grains.	8	...	3	...	...	...	1	...	...	1	...
29. Statement of wholesale and retail prices of Wheat in India.	11	1	4	1	...	...	1	...	...	...	...
30. Cotton Press Returns .	9	13	5	2	...	...	3	...	...	2	...
<i>Weekly.</i>											
31. Return showing the imports into, and exports from, chief ports of Wheat, Jute and Cotton.	...	...	1	...	...	...	...	...	...	...	...
<i>Miscellaneous.</i>											
32. List of Factories and other large Industries in India.	26	9	6	...	...	...	2	...	...	6	...
33. Crop Forecasts † .	71	15	14	12	1	1	13	3	1	4	3
TOTAL .	1,830	308	169	233	3	13	202	87	13	234	59

* Includes 800 copies of

† The total number of forecasts

V.

of the Department of Statistics, India, supplied to recipients abroad and in India.

by the Superintendent, Government Printing, as also those intended for this Department.]

OTHER COUNTRIES.				Total out of India.	INDIA.									GRAND TOTAL.
News- papers.	Government Depart- ments.	Institu- tions, Libra- ries, etc.	News- papers.		Government of India and subordi- nate officers.	Local Govern- ments.	Native States.	Foreign Consuls.	Cham- bers of Com- merce.	Firms.	Institu- tions, Libra- ries, etc.	News- papers.	Total in India.	
3	18	2	...	976	54	81	13	31	16	...	35	60	290	1,266
2	8	...	...	97	30	42	1	28	19	1	12	33	166	268
1	16	1	...	126	29	63	5	34	15	1	27	29	203	329
...	...	...	...	46	24	46	3	21	14	...	16	27	151	197
1	1	...	...	68	25	111	4	9	24	...	74	36	283	351
...	...	...	...	20	21	64	...	3	2	3	32	20	145	165
...	1	...	...	20	23	80	...	4	2	1	27	18	155	175
...	4	...	...	94	127	340	3	16	12	...	16	30	544	638
2	12	1	...	135	65	186	12	28	15	3	49	47	405	540
1	8	1	...	114	65	153	8	26	15	3	34	39	343	457
1	3	1	...	103	50	244	22	24	13	2	34	33	422	525
1	5	2	...	119	48	312	22	25	13	3	42	42	507	626
...	3	1	...	112	44	258	20	22	13	2	36	42	437	549
2	9	1	...	129	55	408	19	19	25	...	32	57	615	744
2	9	1	...	129	55	408	22	19	25	...	32	57	618	747
...	4	...	...	55	39	392	25	11	29	...	18	32	546	601
4	9	1	...	120	27	57	6	22	17	6	38	32	205	325
...	3	...	...	49	20	57	1	4	4	75	12	20	193	242
...	1	...	...	30	46	19	6	...	1	...	4	20	96	126
...	1	1	...	124	223	219	2	17	10	...	15	18	504	628
2	10	1	...	121	52	148	10	27	14	3	20	37	320	441
1	1	...	...	68	25	111	4	8	23	...	74	37	282	350
2	8	...	...	97	30	42	1	23	19	1	12	33	166	263
...	...	...	...	23	29	25	3	...	27	18	16	31	149	172
2	3	...	...	33	24	32	3	20	12	...	9	33	133	166
...	3	...	...	53	26	48	10	8	70	5	32	29	228	281
...	...	...	...	15	26	24	...	7	260	4	22	38	381	396
...	...	...	...	3	12	...	...	...	...	...	...	12	24	27
...	4	...	...	17	18	29	13	2	6	...	...	28	96	113
...	1	...	...	19	17	17	1	...	...	...	...	23	58	77
...	...	...	...	34	24	281	17	4	203	7	4	24	564	598
...	...	...	...	1	11	...	...	...	5	1	14	29	60	61
...	2	...	...	51	24	33	12	...	7	...	2	25	103	154
2	2	...	...	142	25	64	15	62	59	3	23	68	319	461
29	149	14	...	3,343	1,413	4,394	283	529	989	142	822	1,139	9,711	13,054

DEPARTMENT OF STATISTICS, INDIA.

OFFICE CALENDAR.

SECTION 2 PRICES.

3 WAGES.

Name of publication and of part and table thereof.	Year to which the figures relate.	Source (i.e., return, statement, etc.), from which statistics are compiled.	Date on which return or statement should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
Prices and Wages in India— PART I. <i>Wholesale prices.</i> Table No. 1— Summary table showing prices of foodgrains and other articles of country produce and livestock with Index numbers.	Calendar year.	Compiled from Table No. 2 .	...	...	
Table No. 2— Average annual prices of foodgrains and other articles.	Do.	Half-monthly statements of wholesale prices of foodgrains and other articles (published by this department in the Gazette of India).	...	...	
Tables Nos. 3 and 4— Prices of certain staple articles in Calcutta and variations.	January of each year.	Figures are obtained from (1) the Bengal Chamber of Commerce and (2) the Superintending Engineer, Presidency Circle, Public Works Department, Bengal.	15th March	1st February	
Tables Nos. 5 to 8— Prices of staple articles of import and export and variations.	Quotations for July of the previous year and for January of the year under report.	(1) Calcutta Price current and Money market report of the Bengal Chamber of Commerce (weekly). (2) Bombay Market report and Trade Journal published by the Times of India Press, Bombay (weekly). (3) Bombay Chamber of Commerce "Current Quotations" (weekly). (4) Bombay Mill-owners' Association "Current Quotations of local made piece-goods and yarns" (weekly). (5) Karachi Price current and Market report of the Karachi Chamber of Commerce (weekly). (6) Madras Price current and Market report of the Madras Chamber of Commerce (fortnightly). (7) Statement of average market prices of silk, sugar and wheat in Bombay furnished by the Commissioner of Customs, Bombay (monthly). (8) Statement of prices of Rangoon rice furnished by the Chief Collector of Customs, Rangoon (monthly).	Within a week after the close of the period to which the return relates. Within 20 days after the close of the period to which the return relates.	After a week of non-receipt on due date. Ditto . .	30th September.

SECTION 2 PRICES—*contd.*

„ 3 WAGES—*contd.*

Name of publication and of part and table thereof.	Year to which the figures relate.	Source (<i>i.e.</i> , return, statement, etc.), from which statistics are compiled.	Date on which return or state- ment should reach this office.	Date on which reminders are to be issued.	Date on which volume or state- ment is to be published.
1	2	3	4	5	6
Prices and Wages in India—<i>contd.</i> PART I—<i>contd.</i> Wholesale prices— <i>contd.</i> Tables Nos. 5 to 8— <i>contd.</i> Prices of staple articles of import and export and variations.		(9) Figures for opium are obtained from the Govern- ment of Bengal and the Com- missioner of Excise, etc., Bombay (annually). (10) Quotations of Bar Silver are compiled from the daily reports of the Bank of Bengal, Calcutta.	15th March	1st February	
Table No. 9— Average prices of certain staple arti- cles in India and in the United Kingdom.	Calendar year	(1) Calcutta Price current and Money market report of the Bengal Chamber of Commerce (weekly). (2) Bombay Chamber of Com- merce "Current Quotations" (weekly). (3) Statement of prices of Ran- goon rice furnished by the Chief Collector of Customs, Rangoon (monthly). (4) London Economist (weekly) (5) Broomhall's Corn Trade News (weekly). (6) The London Grain, Seed, and Oil Reporter (daily).	Within a week after the close of the period. Within 20 days after the close of the period. Within three weeks after the close of the period. Ditto Ditto	After a week of non-receipt on due date. Ditto 	
Tables Nos. 10 to 12— Average prices in London of certain articles of trade and of Bar Silver and variations.	Do.	(1) London Economist (weekly and monthly supplement). (2) Broomhall's Corn Trade News (weekly). (3) Quotations of Bar Silver are compiled from the daily reports of the Bank of Bengal, Calcutta.	Within three weeks after the close of the period. ...	... ...	
Tables Nos. 13 and 14— Annual average prices paid by the Supply and Trans- port Corps for articles for con- sumption by troops at certain stations in India and variations.	Official . . .	Figures are obtained from the Quarter Master General in India.	September	15th July.	

SECTION 2 PRICES—contd.

„ 3 WAGES—contd.

Name of publication and of part and table thereof.	Year to which the figures relate.	Source (i.e., return, statement, etc.), from which statistics are compiled.	Date on which return or statement should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
Prices and Wages in India—concl'd.					
PART II.					
Retail prices.					
Table No. 15— Summary table showing the prices of foodgrains and salt with Index numbers.	Calendar year	Compiled from Table No. 16.	...	...	
Tables Nos. 16 to 18— Prices of foodgrains and salt and variations.	Do.	Half-monthly statements of retail prices of foodgrains and salt (published by this Department in the Gazette of India).	...	...	
PART III.					
Wages.					30th September.
Tables Nos. 19 to 22— Average monthly wages of skilled and unskilled labour and variations.	{ Calendar Quinquennial	Provincial returns of wages of skilled and unskilled labour for the half-year ending December. Provincial returns of quinquennial wage census (annual in the case of the Central Provinces).	15th January	15th February Three months after due date.	
Tables Nos. 23 and 24— Rates of Wages paid in certain State, Railway, and private industrial establishments.	January of each year except for Tables Nos. 23 (1) and 23(2)(calendar year) and No. 23 (10) (official year).	Figures are obtained from the authorities of certain Government and Railway establishments and certain private firms concerned.	15th March	1st February	

SECTION 2 PRICES—*concl'd.*,, 3 WAGES—*concl'd.*

Name of publication and of part and table thereof.	Year to which the figures relate.	Source (i.e., return, statement, etc.), from which statistics are compiled.	Date on which return or statement should reach this office.	Date on which reminders are to be issued.	Date on which statement is to be published.
1	2	3	4	5	6
Variations in Indian Price Levels expressed in Index Numbers.					
(1) Index number for foodgrains (retail prices).	Calendar year .	Table No. 17 of the volume of Prices and Wages in India.	...	...	
(2) Index number for imported articles.	(i) Mean of two quotations—one in January and the other in July.	(i) Table No. 5 of the volume of Prices and Wages in India.	...	...	
	(ii) Calendar .	(ii) Quotations for salt are obtained from the Collector of Customs, Calcutta.	15th March	1st February	
	(i) Mean of two quotations—one in January and the other in July.	Table No. 7 of the volume of Prices and Wages in India.	...	...	
	(ii) Calendar .	Tables Nos. 17 and 3 of the volume of Prices and Wages in India.	...	...	31st August.
(3) Index number for articles exported and consumed.	(iii) Official .	Quotations for Hides—raw (declared export value) compiled from the annual Seaborne Trade Accounts.	...	...	
	(iv) Mean of two quotations—one in April and the other in October.	Quotations for coal are obtained from the Bengal Coal Company, Limited.	15th March	1st February	
(4) General Index number for all 39 articles.	...	Data obtained from (2) and (3) above.	...	...	
Fortnightly return of wholesale and retail prices of foodgrains, etc., in India.	Fortnightly .	Returns furnished by the Provincial Directors of Agriculture, etc., and Political Officers in the case of Native States.	Within 14 days after the close of the period to which they relate.	After a fortnight from due date.	Within a month after the period to which the return relates.

SECTION 4.

JUDICIAL AND ADMINISTRATIVE STATISTICS.

Name of publication and of its parts and sections.	Year to which the figures relate.	Source from which statistics are compiled.	Date on which return or statement should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
Statistics of British India. VOL. III.—PUBLIC HEALTH.					
1. Vital Statistics	Calendar year	Provincial Sanitary reports and report of the Sanitary Commissioner with the Government of India.	1st July .	15th May .	15th January.
2. Hospitals . .	Do.	Provincial reports on Hospitals and Dispensaries.	1st August .	15th June .	
3. Lunatic Asylums.	Do.	Provincial reports on Lunatic Asylums.	1st June .	15th April .	
4. Vaccination .	Official .	Provincial Vaccination reports and report of the Sanitary Commissioner with the Government of India.	1st August .	15th June .	
5. Wild Animals .	Calendar	Provincial reports on the destruction of wild animals and snakes.	15th April .	1st March .	
VOL. IV.—ADMINISTRATIVE, JUDICIAL AND LOCAL SELF-GOVERNMENT.					
1. Area and Population.	Official .	Figures obtained from Local authorities.	30th September	15th August .	15th April.
2. Administrative Divisions.	Do.	Compiled from Table No. 3 of Area and Population.	...	...	
3. Police . . .	Calendar	Provincial Police reports .	1st September .	15th July .	
4. Jails	Do.	Provincial Jail reports . .	1st June .	15th April .	
5. Port Blair (Penal Settlement).	Partly calendar and partly official.	Returns furnished by Superintendent, Port Blair.	30th September .	15th August .	
6. Registration .	Calendar	Provincial Registration reports	1st June .	15th April .	
7. Presses and Publications.	Official .	Figures obtained from Local Governments. [Information is also collected from a confidential report on publications issued by the Education Department.]	31st October .	15th September .	
8. Emigration . .	Do.	Returns furnished by Local authorities.	30th September .	15th August .	
9. Passengers by Native Passenger Ships.	Do.	Ditto.	31st July .	15th June .	
10. Pilgrims by Pilgrim Ships.	Do.	Figures obtained from Local authorities.	30th June .	15th May .	
11. Judicial Divisions	Calendar	Provincial reports on Civil and Criminal Justice.	1st October .	15th August .	
12. Civil Justice .	Do.	Provincial Civil Justice reports	Do.	Do.	
13. Criminal Justice	Do.	Provincial Criminal Justice reports.	Do.	Do.	
14. Medico-Legal Investigations.	Partly calendar and partly official	Chemical Examiner's reports	15th May .	1st April .	
15. Municipalities .	Official	Provincial Municipal reports .	1st December .	15th October .	
16. District and Local Boards.	Do.	Provincial reports on District and Local Boards.	Do.	Do.	
17. Port Trusts . .	Do.	Port Trust Administration Reports.	30th December .	15th November .	
VOL. V.—EDUCATION.					
1. Education . . .	Official .	Provincial Education reports .	15th November .	1st October .	15th April.

SECTION 5.

INLAND TRADE OF INDIA.

Name of publication.	Names of returns.	From whom received:	Date on which the returns should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
Monthly Trade Fluctuations in selected articles.	Return showing imports by rail into Bombay port.	Government Examiner of Accounts, B. B. & C. I. Ry.	Within six weeks after the end of the month to which it relates.	1st of each month.	Seven weeks after the close of the month to which the returns relate.
	Return showing imports by rail into Madras ports.	Government Examiner of Accounts, B. B. & C. I. Ry.	Ditto .	Ditto .	Ditto.
	Return showing imports by rail and river into Karachi.	Chief Examiner of Accounts, N. W. Ry.	Ditto .	Ditto .	Ditto.
	Return showing imports by rail and river into Calcutta.	Bengal Section of this Department.	Ditto .	Ditto .	Ditto.
	Return showing imports by sea into Bombay port.	Collector of Customs, Bombay.	Within one month after the end of the period to which it relates.	...	Ditto.
	Return showing imports by sea into Karachi.	Chief Collector of Customs in Sind.	Ditto .	...	Ditto.
	Return showing imports by sea into Madras ports.	Collector of Customs, Madras.	Ditto .	...	Ditto.
	Return showing imports by sea into Quilon.	Excise Commissioner, Travancore.	Ditto .	...	Ditto.
Quarterly (Inland Trade of India.)	Returns of the rail-borne trade of the Bombay Presidency.	Director of Agriculture, Bombay.	Three months after the close of the quarter to which they relate.	Six weeks after the close of the quarter to which the returns relate.	Four months and a half after the close of the quarter to which the returns relate.
	Returns of the rail-borne trade of the Madras Presidency.	Government Examiner of Accounts, B. B. & C. I. Ry.	Ditto .	Ditto .	Ditto.
	Returns of the rail-borne trade of the Central Provinces and Berar.	Director of Agriculture and Industries, Central Provinces.	Ditto .	Ditto .	Ditto.
	Returns of the rail and river-borne trade of Sind, and British Baluchistan.	Chief Collector of Customs in Sind.	Ditto	Ditto .	Ditto.
	Returns of the rail and river-borne trade of the Punjab.	Director of Land Records, Punjab.	Ditto .	Ditto .	Ditto.
	Returns of the rail and river-borne trade of the United Provinces of Agra and Oudh.	Director of Land Records and Agriculture, United Provinces.	Ditto .	Ditto .	Ditto.
	Returns of the rail and river-borne trade of Bihar and Orissa.	Director of Agriculture, Bihar and Orissa.	Ditto .	Ditto .	Ditto.
	Returns of the rail and river-borne trade of Assam.	Director of Land Records and Agriculture, Assam.	Ditto .	Ditto .	Ditto.
	Returns of the rail and river-borne trade of Bengal.	Bengal Section of this Department.	Ditto .	Ditto .	Ditto

SECTION 5—*contd.*

INLAND TRADE OF INDIA—*contd.*

Name of publication.	Names of returns.	From whom received.	Date on which the returns should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
Quarterly (Inland Trade of India) — <i>contd.</i>	Return showing imports into Rajputana and Central India from other Native States.	Deputy Auditor, B. B. & C. I. Ry.	Within six weeks after the close of the quarter to which it relates.	Four weeks after the close of the quarter to which the return relates.	Four months and half after the close of the quarter to which the returns rel.
	Ditto . . .	Auditor of Accounts, J. B. Ry.	Ditto .	Ditto .	Ditto.
	Ditto . . .	Chief Auditor, E. I. Ry.	Ditto .	Ditto .	Ditto
	Ditto . . .	Chief Auditor, B. N. Ry.	Ditto .	Ditto .	Ditto.
	Return showing imports into Rajputana and Central India and Nizam's Territory from other Native States.	Chief Auditor, G. I. P. Ry.	Ditto .	Ditto .	Ditto.
	Return showing imports into Rajputana and Central India and Kashmir from other Native States.	Chief Examiner of Accounts, N. W. Ry.	Ditto .	Ditto .	Ditto.
	Return showing imports into Nizam's Territory from other Native States.	Chief Accountant and Auditor, His Highness the Nizam's Gtd. Rys.	Ditto .	Ditto .	Ditto.
	Return showing imports into Nizam's Territory and Mysore from other Native States.	Chief Auditor, and Accountant, M. & S. M. Ry.	Ditto .	Ditto .	Ditto.
Annual (Inland Trade of India).	Return showing imports into Mysore from other Native States.	Comptroller, Public Works and Railway Branch, Bangalore.	Ditto .	Ditto .	Ditto.
	Return showing the trade of the Madras port (Fort St. George) by rail.	Board of Revenue, Madras.	In July each year.	15th June each year.	31st October year.

SECTION 6.

STATISTICS OF TRADE OF BENGAL.

Name of publication.	Names of returns.	From whom received.	Date on which the returns should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published or submitted in manuscript.
1	2	3	4	5	6
Monthly Frontier Trade Accounts Bengal.	<i>Frontier trade, Bengal.</i> Frontier trade returns and statement of value rates in the district of Darjeeling.	Deputy Commissioner of Darjeeling.	On the 10th of the month following that to which they relate.	On the 1st of the month following that to which they relate.	Within one month after the end of the period to which the figures relate. 1st July each year.
Ditto	Frontier trade returns in the district of Jalpaiguri.	Deputy Commissioner of Jalpaiguri.	Ditto	Ditto	
Ditto	Frontier trade returns at registering stations (Chema and Gangtok).	Political Officer in Sikkim.	Ditto	Ditto	
Report on the Frontier Trade of Bengal (annual).	The annual figures are compiled from the monthly returns. Schedules showing the import and export duties levied by the Nepal Darbar on goods crossing the Nepal Frontier.	...	...	...	
	<i>Rail and River-borne trade.</i> <i>Steamer-borne.</i>				
Monthly statements of traffic exported into Calcutta certain principal staples.	Returns of trade of the Calcutta block in principal articles carried wholly by steamers.	Managing Agents, I. G. N. and R. Co. and R. S. N. Co.	Within five weeks after the close of the month to which they relate.	Two weeks after the close of the month to which they relate.	Within seven weeks after the end of the period to which the figures relate.
	Returns of trade of the Calcutta block in principal articles carried partly by rail and partly by steamers.				
	Statements showing the goods traffic at various steamer stations of the C. S. N. Co. in connection with Calcutta.	Managing Agents, C. S. N. Co.	No fixed date. Generally received within three weeks after the close of the month to which they relate.	Ditto	
	Returns of trade between the internal blocks of Bengal and Assam carried by steamers of the different services other than the Ganges despatch service.	Managing Agents, I. G. N. and R. and R. S. N. Cos.	Within 5 weeks after the close of the quarter to which they relate.	Two weeks after the close of the quarter to which the returns relate.	
Quarterly Accounts of Trade carried by Rail and River in Bengal (not published but the statistics are kept in manuscript).	Returns of traffic between the Bengal blocks and blocks of the United Provinces and Assam carried by steamers of the Ganges despatch service.	Managing Agents, I. G. N. and R. Co.	Ditto	Ditto	Within three months after the end of the quarter to which the figures relate.
	Returns of trade between the Calcutta block and other blocks in Bengal and Bihar and Orissa carried by steamers.	Managing Agents, I. G. N. and R. and R. S. N. Cos.	Ditto	Ditto	
	Statements showing the trade exported to a river station in Bengal from the stations of the Assam Bengal Railway by steamer services other than the Ganges despatch service.	Ditto	Ditto	Ditto	

SECTION 6—contd.

STATISTICS OF TRADE OF BENGAL—contd.

Name of publication.	Names of returns.	From whom received.	Date on which the returns should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published or submitted in manuscript.
1	2	3	4	5	6
Quarterly Accounts of trade carried by Rail and River in Bengal (not published but kept in manuscript).	Rail and River-borne trade—contd.				
	Steamer-borne—contd.				
	Statements of traffic exported to a river station from the stations of the Assam Bengal and Dibru-Sadiya Railways by the steamers of the Ganges despatch service transhipped at Chandpur and Gauhati.	Managing Agents, I. G. N. and R. Co.	Within 5 weeks after the close of the quarter to which they relate.	Two weeks after the close of the quarter to which they relate.	Within three months after the end of the quarter to which the figures relate.
Monthly statements of traffic imported into or exported from Calcutta in certain principal articles.	Boat-borne.				
	Returns of trade of the Calcutta block registered at the inland vessels wharves.	Vice-Chairman, Calcutta Port Commissioners.	Within one week after the close of the month to which they relate.	On the 1st of the month following that to which they relate.	Within seven weeks after the end of the period to which the figures relate.
	Returns of trade of the Calcutta block registered in the Circular and Kristopur Canals and Tolly's Nulla.	Assistant Engineer, Calcutta Canals Sub-Division.	Within 15 days after the close of the month to which they relate.	Ditto	
	Statement of export trade by boat and cart in Kerosene oil from Budge Budge to places other than Calcutta.	Vice-Chairman, Calcutta Port Commissioners.	Generally received within 4 weeks after the close of the month to which it relates.	Ditto	
	Statement showing the quantities of salt discharged from vessels in the stream into country boats for export to places outside the Calcutta block.	Collector of Customs, Calcutta.	Within 4 weeks after the close of the month to which it relates.	Ditto	
Quarterly Accounts of trade carried by rail and river in Bengal (not published).	Registers containing the particulars of daily traffic by boats entering and leaving the Kidderpore Docks.	Dock Master, Kidderpore Docks.	Within one week after the close of every month.	Ditto	Within three months after the end of the quarter to which the figures relate.
	Returns showing the boat traffic registered at Dhubri and Bhairub Bazar.	Director of Land Records and Agriculture, Assam, and the Collector of Mymensingh.	No fixed date	Just after the close of the quarter to which they relate.	

SECTION 6—contd.

STATISTICS OF TRADE OF BENGAL—contd.

Name of publication.	Names of returns.	From whom received.	Date on which the returns should reach this office.	Date on which reminders are to be issued.	Date on which the volume or statement is to be published.
1	2	3	4	5	6
Annual statements of traffic imported into or exported from Calcutta by all routes.	<i>Rail and River-borne trade—contd.</i>				
	Road-borne.				
	Compiled from the returns of trade of the Calcutta block registered at the road stations in the 24 Parganas.	District Engineer, 24-Parganas.	...	...	1st October each year.
	Compiled from the returns of trade of the Calcutta block registered at the road stations in Howrah.	Magistrate, Howrah.	...	...	
Annual Report on the trade carried by rail and river in Bengal.	Sea-borne.				
	Statement of sea-borne trade of Calcutta, foreign and coastwise.	Collector of Customs, Calcutta.	First of August each year.	On the 15th June each year.	Ditto.
Monthly statements of traffic imported into or exported from Calcutta in certain principal articles.	Rail-borne.				
	Returns of import as well as export trade of the Calcutta block in principal articles carried over—				
	E. I. Ry. . . .	Chief Auditor, E. I. Ry.	Within five weeks after the close of the month to which they relate.	Two weeks after the close of the month to which they relate.	Within seven weeks after the end of the period to which the figures relate.
	E. B. Ry. . . .	Examiner of Accounts, E. B. Ry.			
	B. N. Ry. . . .	Chief Auditor, B. N. Ry.			
	D. S. Ry. . . .	Chief Accountant, Assam Railways and Trading Co., Ltd.			
	Returns of export trade only of the Calcutta block carried over—				
	A. B. Ry. . . .	Chief Auditor, A. B. Ry.	Ditto	Ditto	Ditto.
	B. & N.-W. Ry. . .	Chief Auditor, B. & N.-W. Ry.			
	B. P. Ry. . . .	Auditor, B. P. Ry. .			
	O. & R. Ry. . . .	Examiner of Accounts, O. & R. Ry.			
	N. W. Ry. . . .	Examiner of Accounts, N. W. Ry.			
	G. I. P. Ry. (I. M. Sec.)	Chief Auditor, G. I. P. Ry.			
	R. K. Ry. . . .	Auditor of Accounts, R. K. Ry.			
	Railways in Southern India.	Government Examiner of Accounts, B. B. & C. I. Ry.			

SECTION 6—contd.

STATISTICS OF TRADE OF BENGAL—contd.

Name of publication.	Names of returns.	From whom received.	Date on which the returns should reach this office.	Date on which reminders are to be issued.	Date on which the volume or statement is to be published.
1	2	3	4	5	6
Quarterly Accounts of trade carried by rail and river in Bengal (not published).	<i>Rail and River-borne trade—contd.</i>				
	<i>Rail-borne—contd.</i>				
	Returns showing the export trade of Bengal carried over—				
	E. I. Ry. . . .	Chief Auditor, E. I. Ry.	Within six weeks after the close of the quarter to which they relate.	Two weeks after the close of the quarter to which they relate.	Within three months after the end of the quarter to which the figures relate.
	E. B. Ry. . . .	Examiner of Accounts, E. B. Ry.			
	B. N. Ry. . . .	Chief Auditor, B. N. Ry.			
	A. B. Ry. . . .	Chief Auditor, A. B. Ry.			
	G. I. P. Ry. (I. M. Sec.)	Chief Auditor, G. I. P. Ry.			
	O. & R. Ry. . . .	Examiner of Accounts, O. & R. Ry.			
	B. & N.-W. Ry. . . .	Chief Auditor, B. & N.-W. Ry.			
	N. W. Ry. . . .	Examiner of Accounts, N. W. Ry.	Within 59 days after the close of the quarter.	Three weeks after the close of the quarter.	
	B. B. & C. I. Ry. . . .	Government Examiner of Accounts, B. B. & C. I. Ry.			
	G. I. P. Ry. . . .				
	M. & S. M. Ry. . . .				
	S. I. Ry. . . .				
	J. B. Ry. . . .				
	Nizam's G. Ry. . . .				
	R. & K. Ry. . . .	Auditor of Accounts, R. & K. Ry.	Within six weeks after the close of the quarter to which they relate.	Two weeks after the close of the quarter.	Within three months after the end of the quarter to which the figures relate.
	D. S. Ry. . . .	Chief Accountant, Assam Rys. and Trading Coy.			
	Returns showing the import and the internal trade of Bengal carried over—				
	E. I. Ry. . . .	Chief Auditor, E. I. Ry.			
	E. B. Ry. . . .	Examiner of Accounts, E. B. Ry.			
	B. N. Ry. . . .	Chief Auditor, B. N. Ry.			
	B. P. Ry. . . .	Auditor, B. P. Ry.			
	A. B. Ry. . . .	Chief Auditor, A. B. Ry.			
	Returns of value rates of articles entering into the rail-borne trade.	Commissioner of Police, Calcutta.	Within 15 days after the close of the quarter.	One week after the close of the quarter.	Ditto.
		Collector of Burdwan			
		„ Dacca .			
		„ Pubna .			
		„ Chittagong.			
		„ Customs, Calcutta.			

SECTION 6—*contd.*STATISTICS OF TRADE OF BENGAL—*contd.*

Name of publication.	Names of returns.	From whom received.	Date on which the returns should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
Quarterly Accounts of trade carried by rail and river in Bengal (not published.	<i>Rail and River-borne trade—concl'd.</i>				
	<i>Rail-borne—concl'd.</i>				
Quarterly Accounts of trade carried by rail and river in Bengal (not published.	Returns showing the value rates of articles from all Provincial Officers.	Director of Land Records and Agriculture, Assam. Director of Agriculture, Bihar and Orissa. Director of Land Records and Agriculture, United Provinces. Director of Land Records, Punjab. Director of Agriculture and Industries, Central Provinces. Chief Collector of Customs in Sind. Government Examiner of Accounts, B. B. and C. I. Ry. Secretary to the Commissioner of Revenue Settlements, Survey, Land Records and Agriculture, Madras.	Ten weeks after the close of the quarter.	Eight weeks after the expiry of the quarter to which the returns relate.	1st October each year.
	Returns showing the statistics of trade in Government treasure and opium carried between Bengal and Assam.	Director of Land Records and Agriculture, Assam.	No date fixed but generally received within six weeks after the quarter to which the statistics relate.	Two weeks after the close of the quarter to which the figures relate.	Within three months after the end of the quarter to which the figures relate.
Annual	Statistics of the quantities of saltpetre imported into and exported from Calcutta by sea during each official year.	Collector of Customs, Calcutta.	No date fixed but generally received in the month of April.	On 1st March each year.	The figures are supplied to the Commissioner, Northern India Salt Revenue.
Annual Report on the trade carried by rail and river in Bengal.	Cost of manufacturing opium.	Secretary, Board of Revenue, United Provinces.	No date fixed but generally received by the 1st week of January each year.	Reminder generally issues in the second week of December.	Required for calculating the value rate for the head "Intoxicating Drugs (other than Opium.)"
	Cost of manufacturing Bhang and Charas.	Secretary, Board of Revenue, Bihar and Orissa.	Ditto	Ditto	
	Cost of manufacturing Ganja.	Secretary, Government of Bengal, Financial Department.	Ditto	Ditto	
	Figures of trade in Ganja, Bhang and Charas in Bengal.	Commissioner of Excise and Salt, Bengal.	Ditto	Ditto	

SECTION 6—concl'd.

STATISTICS OF TRADE OF BENGAL—concl'd.

Dates on which the various returns required for compilation of the Statistics of Trade of Calcutta carried by rail and river are due to this office for publication in the Indian Trade Journal.

Name of publication.	Names of returns.	From whom received.	Date on which the returns should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
	<i>Boat-borne trade.</i> Statements of Jute and Rice imported into Calcutta and of despatches of sugar from Calcutta registered at the inland vessels wharves. Statement of imports of Jute and Rice and of despatches of sugar registered at the various Calcutta canal stations. <i>Road-borne trade.</i> Statement showing imports of Jute and Rice and despatches of sugar registered at the various road stations in the Districts of Howrah and 24-Parganas. <i>Rail-borne trade.</i> Statements showing the arrivals of produce and minerals at Calcutta by East Indian Railway and the despatches of piece-goods and sugar from Calcutta. Statements showing the arrivals of produce and minerals at Calcutta by Bengal Nagpur Railway and the despatches of piece-goods and sugar from Calcutta. Statements showing principal commodities arrived into Calcutta by Eastern Bengal Railway and also the despatches of piece-goods and sugar from Calcutta.	Superintendent, Inland Vessels Wharves, Calcutta. Supervisor, Calcutta Canals. Magistrates, Howrah and 24-Parganas. General Traffic Manager, East Indian Railway. Superintendent of Goods, Bengal Nagpur Railway. Traffic Manager, Eastern Bengal Railway.	On Tuesday following the week to which they relate. Ditto Ditto Ditto Ditto Ditto	... If the statistics do not reach in time they are included in the next week. 	Every Friday in the Indian Trade Journal.

SECTION 7.

SEA-BORNE TRADE (FOREIGN) AND COASTING TRADE OF BRITISH INDIA.

Name of publication.	Particulars of returns.	From whom received.	Date on which the returns should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
Monthly Customs Revenue statement.	Statement of gross sea and land Customs revenue. (In thousands of rupees.)	Received by wire from the Collectors of Customs, Bombay, Sind, Madras, Burma, and Balasore, and by letter from the Collector of Customs, Calcutta.	4th of the month following that to which the figures relate.	...	5th of the month following that to which the figures relate.
Ditto . .	Figures of excise duty collected on woven cotton goods.	Received by wire from the Deputy Commissioners, Delhi and Lahore, the Extra Assistant Commissioner, Ajmer and Merwara, the Government of the United Provinces, the Customs authority, Central Provinces.	By the second of the month following that to which the figures relate.	...	
Ditto . .	Statement of gross sea and land Customs revenue. (In rupees up to the unit figure.)	From the Collectors of Customs of the maritime provinces.	By the middle of the month following that to which the returns relate.		
(1) Monthly accounts of the Foreign Sea-borne trade and navigation of British India.	No. 10-3—Imports—Foreign Trade	Collectors of Customs of the several maritime provinces.	By the second week of the month following that to which the returns relate.	...	25th of the month following that to which the returns relate.
	No. 11—Re-exports . . .				
	No. 12—Exports . . .				
	No. 15—Duty—Imports . . .				
	No. 16—Duty—Exports . . .				
	No. 18—Bonded Warehouse account				
	No. 19 { Imports and Exports of " 19-A { Treasury : Foreign Trade.				
	No. 25-1—Sailing vessels—Entered				
	No. 25-2— " —Cleared				
	No. 25-3—Steamers—Entered .				
(2) Monthly review of the Sea-borne trade of British India.	No. 25-4— " —Cleared .				
	Monthly returns of the trade and navigation of Aden.	Trade Registrar, Aden.	Ditto .	...	Published with (2) Monthly Review of the Sea-borne Trade.
	Sea-borne trade and navigation accounts for the calendar year.	...	...	...	6th February.

SECTION 7—contd.

SEA-BORNE TRADE (FOREIGN) AND COASTING TRADE OF BRITISH INDIA—contd.

Name of publication.	Particulars of returns.	From whom received.	Date on which the returns should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
Annual Review of the trade of India.	Compiled from the monthly accounts for March and the annual abstracts and ledgers. Prices, wages, freights, inland trade, frontier trade, etc., compiled in the respective sections.				
Annual Statement of the Foreign Sea-borne trade of British India, Volume I.	Monthly returns Nos. 10-3, 11, 12, 19 and 19-A noted against the monthly accounts are compiled into Annual Abstracts and ledgers for this volume and also annual return No. 10-1. (Free Imports of Foreign Merchandise.) In addition to the monthly returns noted against Volume I, monthly returns Nos. 14-Duty at each port, 15-Duty imports, 16-Duty exports, 17-Refunds and Drawbacks, 18-Bonded warehouse account, 18-1-Principal articles of imported merchandise allowed free of duty, 24 and 24-1-Sailing and steam vessels built and first registered at each port and 25-1 to 25-4-Shipping returns are compiled into Annual Abstracts for this volume. The following special annual returns are also required for this volume:— (a) Statement showing the total value of imports and exports of merchandise and treasure at each port during the official year. (b) Statement showing the number and tonnage of shipping entered and cleared at each port during the official year. (c) Statement showing the total value of trade (private merchandise) with each foreign country. (d) Advance proof of the abstract tables relating to the Foreign Sea-borne trade of the chief ports of the several maritime provinces. (e) Return of the trade of the French Possessions in India. (f) Return of the trade of the Portuguese Possessions in India. (g) Printed tables of the trade and navigation of Aden.	Collectors of Customs of the maritime provinces.	Return No. 10-1 is due on or before the 31st May of each year.	...	30th September.
Annual Statement of the Foreign Sea-borne trade of British India, Volume II.		Collectors of Customs of the maritime provinces.	By the middle of June. Ditto By the middle of August. Ditto	By the middle of April. Ditto Ditto Ditto	20th November.
		French Government at Pondicherry.	...	By the beginning of September.	
		Portuguese Government at Goa.	...	Ditto	
		Government of Bombay.	First week of October.	Beginning of September.	
Statistical tables showing the estimated value of the imports and exports into and from India, at the prices prevailing in 1899-1900 to 1901-02 and in the year previous to the year under report.	These tables are compiled from the annual abstracts and ledgers.				

SECTION 7—*contd.*SEA-BORNE TRADE (FOREIGN) AND COASTING TRADE OF BRITISH INDIA—*contd.*

Name of publication.	Particulars of returns.	From whom received.	Date on which the returns should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
Annual statement of the Coasting trade and navigation of British India.	<i>Monthly returns.</i>				
	No. 20-1—Imports—Indian Produce	From the Collectors of Customs of the maritime provinces.	By the end of the month following that to which the returns relate.	...	20th December.
	No. 20-2—Do. Foreign Merchandise.				
	No. 21-1—Exports—Indian Produce				
	No. 21-2—Do. Foreign Merchandise.				
	No. 23—Imports and Exports of Treasure.				
Tables showing the share of each foreign country in the total import and export trade, published in the Monthly Sea-borne trade accounts for April.	No. 26-1—Vessels entered	Ditto	By the middle of September.	...	
	No. 26-2—Vessels cleared.				
	<i>Annual.</i>				
	Advance proof of the abstract tables relating to the coasting trade of the chief ports of the several maritime provinces.				
	NOTE.—Special annual returns marked (a) and (b) against Foreign Sea-borne trade annual volume if also show coasting trade figures which are utilised for this volume.				
	Statement showing the respective shares of each foreign country in the annual grand total value of imports, exports, and re-exports.	Ditto	By the end of April	By the beginning of April.	By the 25th of May
	The following statements are received in this Section for the returns of the International Institute of Agriculture, Rome, and for statements published in the <i>Indian Trade Journal</i> , for Review, etc.:—				
	(1) Monthly statement of the imports and exports of principal foodgrains, raw cotton, and linseed.	Collectors of Customs of the several maritime provinces.	2nd week of the month following that to which the returns relate.		
	(2) Monthly statement showing the exports of bunker coal from Calcutta.	Collector of Customs, Calcutta.	No fixed date.		
	(3) Monthly statement showing the exports of tea to foreign countries from Travancore.	Resident in Travancore.			

SECTION 7—*contd.*

SEA-BORNE TRADE (FOREIGN) AND COASTING TRADE OF BRITISH INDIA—*contd.*

Name of publication.	Particulars of returns.	From whom received.	Date on which the returns should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
	(4) Monthly statement showing the export of rice from Bangkok.	His Britannic Majesty's Consul, Bangkok.	No fixed date.		
	(5) Quarterly statement of the exports of Palmyra fibre from the Madras Presidency.	Collector of Customs, Madras.	Ditto.		
	(6) Annual statement showing the exports of coffee from Travancore.	Board of Revenue, Madras.			
	<i>Weekly Trade movements.</i>				
(1) Weekly note on the Imports and Exports of Wheat, Jute, and Cotton at the Chief ports.	Statement showing (i) the imports into Calcutta by sea of foreign twist and yarn, piece-goods (grey, white, other), kerosene oil, and Sugar and (ii) the exports from Calcutta by sea of Indian twist and yarn, jute, raw, gunny bags, gunny cloth, linseed, rape and mustard seed, rice, tea, wheat, sugar by sea and coastwise.	Collector of Customs, Calcutta.	On Tuesday following the week to which they relate.	...	(1) On the second Monday following the week to which the figures relate.
(2) Statement of the weekly trade movements published in the <i>Indian Trade Journal</i> .	Statement showing (i) the imports into Bombay by sea, of foreign twist and yarn, piece-goods (grey, white, other) raw cotton, linseed, rape and mustard seed, wheat, kerosene oil, and sugar and (ii) the exports from Bombay by sea of Indian twist and yarn, cottonseed, linseed, rape and mustard seed, rice, wheat, and despatches of Indian and foreign piece-goods by rail, and of sugar by Bombay, Baroda and Central India Railway.	Received by wire from the Collector of Customs, Bombay.	Ditto	...	(2) On Friday following the week to which the figures relate.
	Statement showing (i) the imports into Karachi by sea of piece-goods (grey, white, other), raw cotton and wheat by rail, linseed, rape and mustard seed by rail and river, kerosene oil, and Sugar by sea, and (ii) the exports from Karachi by sea of linseed, rape, and mustard seed, wheat, rice, and sugar, by rail.	Received by wire from the Chief Collector of Customs in Sind, Karachi.	Ditto	...	
	Statement showing (i) the imports into Madras by sea of foreign twist and yarn, piece-goods (grey, white, other), sugar, and kerosene oil, and (ii) the exports from Madras by sea of Indian twist and yarn, rice; and piece-goods (Indian and foreign) by rail.	Received by wire from the Collector of Customs, Madras.	Ditto	...	

SECTION 7—*concl'd.*

SEA-BORNE TRADE (FOREIGN) AND COASTING TRADE OF BRITISH INDIA—*concl'd.*

Name of publication.	Particulars of returns.	From whom received.	Date on which the returns should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
(1) and (2) on the preceding page.	<i>Weekly Trade movements—cont'd.</i>				
	Statement showing (i) the imports into Rangoon by sea of piece-goods (grey, white, other); and sugar. (ii) The exports from Rangoon by sea of rice; and kerosene oil from Burma.	Received by wire from the Chief Collector of Customs, Burma.	On Tuesday following the week to which they relate.	...	(1) and (2) on the preceding page.
	Exports by sea of jute, tea, and rice.	Received by wire from the Collector of Customs, Chittagong.	Ditto	...	

SECTION 8.

FRONTIER LAND TRADE OF BRITISH INDIA.

Name of publication.	Particulars of returns.	From whom received.	Date on which returns are due.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
Monthly Accounts relating to the trade by land of British India with Foreign countries.	Returns of trade across the frontier of Sind and British Baluchistan.	Chief Collector of Customs in Sind.	Within one month after the close of the month to which they relate.	...	Three weeks after the receipt of the last provincial return.
	Returns of trade across the frontier of the North-West Frontier Province.	Revenue Commissioner, North-West Frontier Province.	Fifty-five days	...	
	Returns of trade across the frontier of Kashmir.	Resident in Kashmir.	Seven weeks	...	
	Returns of trade across the frontier of the Punjab.	Director of Land Records, Punjab.	One month	..	
	Returns of trade across the frontier of the United Provinces.	Director of Land Records and Agriculture, United Provinces.	Forty days	...	
	Returns of trade across the frontier of Bihar and Orissa.	Director of Agriculture, Bihar and Orissa.	Six weeks	...	
	Returns of trade across the frontier of Bengal.	Bengal Section of this Department.	Ditto.	...	
	Returns of trade across the frontier of Assam.	Director of Land Records and Agriculture, Assam.	One month	...	
	Returns of trade across the frontier of Burma.	Commissioner of Settlements and Land Records, Burma.	Forty days	...	

SECTION 9.

AGRICULTURAL STATISTICS.

Name of publication and of its parts and tables.	Year to which the figures relate.	Source (i.e., return, statement, etc.), from which statistics are compiled.	Date on which return or statement should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
(1) Forecasts of Crops —See separate list—Appendix III (2) Agricultural Statistics of India—Volume I, British Provinces—		(See separate list.)			
Table I, Area . . .	Revenue or Agricultural year ending on different dates in different provinces between 31st March and 30th September.	Returns received from Provincial authorities.	(a) 1st November.	1st September	30th July.
„ II, Classification of area.			(b) 1st December.		
„ III, Area under crops			(c) 31st December.	1st November	
IV, Live-stock, etc. .			(d) 1st February.		
„ V, Land Revenue .					
„ VI, Transfers of land					
Appendix A, Average yield per acre of crops.	Quinquennial .	Ditto	1st July, every fifth year.	15th May, every fifth year.	
Appendix B, Changes in boundaries.	(As against tables I—VI.)	Ditto	Same as for tables I—IV.	...	
Explanatory Notes .	Ditto	As revised by Provincial authorities.	30th December.	1st November	
(3) Agricultural Statistics of India—Volume II, Native States—					
Tables . . .	Revenue or Agricultural year ending on different dates in different States between 31st March and 31st October.	Returns received through Political Officers in Native States.	Within six months after the close of the year of report.	1st January and 1st April.	30th October.
Explanatory Notes .	Ditto	As revised by the State authorities.	15th March	1st January.	
(4) Report on Tea Production—	Calendar .	Returns received from Provincial authorities. [Figures regarding prices obtained from Prices and Wages section, figures regarding capital from Financial and Commercial section, and trade figures from Seaborne and Land Trade Sections.]	15th April	1st March.	20th June.
(5) Area and Yield of Crops—					
Tables . . .	Year ending with spring harvest.	Compiled from general memoranda on crops of which the last is issued by the middle of August.	...	...	30th July.
Explanatory Notes .	Ditto	As revised by Provincial authorities.	30th May	1st April.	
(6) Half-monthly Cotton Press Returns.	Half-monthly	Returns received from provincial authorities and Bombay Chamber of Commerce.	Within 10 days after the close of the half-month to which the return relates.	15th and 30th of each month (by telegram).	Within 20 days after the close of the half-month to which the return relates.

(a) For Bengal, Central Provinces and Berar, Bihar and Orissa, Assam, Ajmer, Coorg, and Manipur.
(b) For Burma and for tables I to IV and VI of Bombay and United Provinces.
(c) For Madras, Punjab, North-West Frontier Province, and Delhi.
(d) For table V of Bombay and United Provinces.

SECTION 10.

FINANCIAL AND COMMERCIAL STATISTICS.

Name of publication and of its parts and sections.	Year to which the figures relate.	Source from which statistics are compiled.	Date on which return or statement should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
Statistics of British India					
Vol. I.—Commercial.					
1. Industrial Census . . .	...	Report of the Census of India.	...	...	
2. { (a) Factories . . .	Calendar year . . .	Provincial Factory reports	1st July . . .	15th May . . .	
{ (b) Other large Industries.	Do.	Returns furnished by local authorities.	1st June . . .	15th April . . .	
3. Breweries	Do.	Ditto	15th March . . .	1st February . . .	
4. Cotton mills	Official	Ditto	15th June . . .	1st May	
5. Jute mills	Do.	Figures obtained from local authorities.	Do.	Do.	
6. Paper mills	Calendar	Ditto	1st April	15th February . . .	
7. Woollen mills	Do.	Ditto	Do.	Do.	
8. Mineral Production . . .	Do.	Figures obtained from Director, Geological Survey.	30th June . . .	15th May	
9. Coal mines	Do.	Reprinted from the Blue Book relating to Production and Consumption of Coal in India, issued separately.	...	...	
* 10. Joint Stock Companies	Partly official and partly calendar.	(a) Returns and reports furnished by the provincial authorities.	1st July	15th May	
		(b) Figures for Foreign Tea Companies, obtained from Indian Tea Association and United Planters' Association of Southern India.	30th April . . .	15th March . . .	28th February.
11. Patents and Designs . .	Calendar	Notifications and Reports of Patents Office, and certain information obtained unofficially from that office in June.	1st June	1st May	
12. Foreign Trade and Shipping.	Official	Compiled from Sea-borne Trade Accounts in Section 7.	...	...	
13. Wrecks	Calendar	Figures obtained from Port Officer and Registrar of Wrecks, Calcutta.	15th June . . .	1st May	
14. Merchandise Marks . .	Official	Provincial Maritime Trade Reports received in Section 7.	August	...	
15. Post Office	Do.	Figures obtained from Director-General of Posts and Telegraphs.	30th September .	1st August . . .	
16. Telegraphs	Do.	Ditto	31st August . . .	1st July	
17. Railways	Do.	Railway Administration Report and Finance and Revenue Accounts.	30th September .	...	
* 18. Irrigation	Do.	Consolidated statement issued by the Public Works Department, Government of India.	1st April	15th February . .	
		Provincial Irrigation Reports.	September	...	

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SECTION 10—contd.

FINANCIAL AND COMMERCIAL STATISTICS—contd.

Name of publication and of its parts and sections.	Year to which the figures relate.	Source statement, etc., from which statistics are compiled.	Date on which return or statement should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
Statistics of British India—contd. Vol. II.—Financial Part I					
1. Revenue and Expenditure	Official year	Finance and Revenue Accounts of the Government of India.	End of March .	...	
2. Mint and Coinage .	Do. .	Figures obtained from Mint Masters.	30th May .	15th April .	
3. Paper Currency .	Do. .	Returns furnished by Controller of Currency.	15th December .	1st November .	
4. Registered Debt .	Do. .	(a) Finance and Revenue Accounts. (b) Returns furnished by Bank of Bengal and Controller of Currency. [Returns of Loans are also received from India Office.]	End of March . 15th May .	... 1st April .	
5. Securities enfaced for payment of interest in London	Calendar .	Returns furnished by Bank of Bengal.	15th January .	1st January .	
6. Council Bills and Telegraphic Transfers.	Official .	Returns furnished by Controller of Currency, Comptroller, India Treasuries, and Accountants-General, Madras and Bombay.	30th June .	15th May .	
7. Ways and Means of Home Government.	Do. .	Home Accounts of the Government of India (Account No. 8). Account (final) of the Receipts and Disbursements of the Home Treasury of the Government of India (received from Finance Department).	July . November .	... ...	15th July.
8. Prices of Gold and Silver and Rates of Exchange.	Partly calendar and partly official.	(a) Figures obtained from Controller of Currency. (b) Prices Current returns of Chambers of Commerce. (c) Bank of England rates of discount taken from <i>Bankers' Magazine</i> .	December . ... ...	... ... ...	
9. Military Services	Official .	Finance and Revenue Accounts.	End of March .	...	
10. Post Office Savings Bank.	Do. .	Figures obtained from Director-General of Posts and Telegraphs.	30th September .	15th August .	
11. Banks . . .	Calendar .	Reprinted from the Blue Book relating to Banks in India, issued separately.	...	...	
12. Co-operative Societies .	Official .	Reports published by provincial authorities. Consolidated statement issued by Revenue and Agriculture Department.	1st October . 1st December .	... 15th November .	
13. Life Assurance .	Do. .	Report published by the Actuary to the Government of India.	August .	...	

SECTION 10—*contd.*FINANCIAL AND COMMERCIAL STATISTICS—*contd.*

Name of publication and of its parts and sections.	Year to which the figures relate.	Source from which statistics are compiled.	Date on which return or statement should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
Statistics of British India—<i>concl'd.</i> Vol. II.—Financial—<i>contd.</i> Part II					
1. Land Revenue . . .	Official year .	Finance and Revenue Accounts.	End of March .	...	
2. Forests . . .	Do. .	Annual Report of Inspector-General, Forests.	1st December .	15th November .	
3. Opium . . .	Partly official and partly calendar.	Figures obtained from local authorities and from British Consuls at Tamsui and Bangkok, and a statement relating to opium weighments, etc., obtained from Finance Department. [Figures are also taken from Finance and Revenue Accounts, Straits Settlements returns kept up in the Finance Department, China Trade Report, and Sea-borne trade accounts.]	30th June .	15th May .	
4. Salt . . .	Ditto. .	(a) Returns of production furnished by local authorities. (b) Figures of consumption, etc., obtained from local authorities.	31st March . 30th June .	15th February . 15th May .	
5. Stamps . . .	Official .	(a) Returns furnished by provincial authorities. (b) Certain information obtained from the Comptroller, India Treasuries.	Do. . Do. .	Do. . Do. .	15th July.
6. Excise . . .	Do. .	(a) Returns and reports furnished by provincial authorities. (b) Certain figures of duty obtained from provincial authorities.	Do. . Do. .	Do. . Do. .	
7. Provincial Rates .	Do. .	Finance and Revenue Accounts.	End of March .	...	
8. Customs Revenue .	Do. .	Compiled partly from Sea-borne Trade Accounts in Section 7 and partly from Tariff Schedules. (a) Figures obtained from Ajmer, Coorg, and Bangalore. (b) Returns furnished by provincial authorities and the Comptroller, India Treasuries, Director-General, Posts & Telegraphs and Military Accountant General.	... 31st July . 30th September .	... 15th June . 15th August .	
9. Income Tax . . .	Do. .				
10. Tributes from Native States.	Do. .	Finance and Revenue Accounts.	End of March .	...	
11. Interest Receipts .	Do. .	Finance and Revenue Accounts.	Do .	...	

SECTION 10—contd.

FINANCIAL AND COMMERCIAL STATISTICS— contd.

Name of publication.	Year to which the figures relate.	Source from which statistics are compiled.	Date on which return or statement should reach this office.	Date on which reminder* are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
List of Factories and other large industries in India.	Calendar year	Returns of large industries furnished by local authorities. Returns prepared by owners or managers of factories and furnished through provincial Inspectors of Factories.	1st June . . 1st July . .	15th April . . 15th May . .	15th December (every alternate year).
Statistics of Cotton Spinning and Weaving in Indian Cotton Mills.	Monthly . .	Returns furnished by local authorities.	Within a month following that to which the figures relate.	1st of the second month following that to which the figures relate.	12th of the second month following that to which the figures relate.
Report on the production and consumption of Coal in India.	Calendar . .	Figures obtained from :— Chief Inspector of Mines in India. Director, Geological Survey of India. His Britannic Majesty's Consul General at Yokohama. Registrar of Imports and Exports, Singapore. Secretary, Chamber of Commerce and Exchange, Singapore. Secretary, Ceylon Chamber of Commerce, Colombo. General Traffic Manager, East Indian Railway, Calcutta. Steamer Companies . . Port Officers in India . . Agents or owners of Tea Companies. Agents or owners of iron and brass foundries. Agents of Inland Steamer Companies. Secretary, Indian Jute Mills Association. Agents or owners of Cotton Mills in India.	15th May . . 30th May . . 1st July . . 1st June . . Do. . . Do. . . 30th April . . Do. . . Do. . . Do. . .	1st April . . Do. . . 15th March . . Do. . . Do. . . Do. . . Do. . . Do. . .	15th August.

SECTION 10—concl'd.

FINANCIAL AND COMMERCIAL STATISTICS—concl'd.

Name of publication.	Year to which the figures relate.	Source from which statistics are compiled.	Date on which return or statement should reach this office.	Date on which reminders are to be issued.	Date on which volume or statement is to be published.
1	2	3	4	5	6
Statistics relating to Joint Stock Companies in British India and Mysore.	Official for Companies incorporated in India.	Reports furnished by provincial authorities.	1st July . .	15th May . .	1st November.
		[For Statistics of Hong-kong and Shanghai Bank figures are compiled from Banking return obtained from the Agent of that bank for the Blue Book relating to Banks in India issued separately.]	...	...	
	Calendar for Companies incorporated outside India.	Returns obtained from provincial authorities.	1st July . .	15th May	
Half-yearly statement of increase or decrease in the Capital of Companies incorporated in India.	Half-yearly .	Returns received from Registrars, Joint Stock Companies.	Not later than a month after the expiry of the half-year.	1st February and 1st July.	1st March and 1st August.
Indian Monetary Statistics	Official .	Report on the operation of the Currency Department.	1st September .	...	21st December. (Not published, but printed and copies sent to India Office and to the Paris and the United States of America Mints.)
		Administration Reports of Calcutta and Bombay Mints.	15th September .	...	
		Statement of exports of each denomination of cent pieces from Bombay obtained from the Collector of Customs, Bombay.	31st August .	1st August .	
Statistical Tables relating to Banks in India.	Calendar .	Figures obtained from Banks in India and for Exchange Banks through the India Office. (Data also taken from the banking numbers of <i>Statist</i> and <i>Economist</i> .)	1st April . .	15th January .	31st July.

Appendix VII.

SELECTED ENQUIRIES RECEIVED IN THE DEPARTMENT OF STATISTICS.

From whom received.	Subject.
Prices and Wages.	
1914.	
Government of India, Department of Commerce and Industry.	Information as to the cost of living in Calcutta with reference to a memorial submitted by the clerks in the Government Central Press, Calcutta, for an increase of their salaries.

SELECTED ENQUIRIES RECEIVED IN THE DEPARTMENT OF STATISTICS—*contd.*

From whom received.	Subject.
<i>Prices and Wages—contd.</i>	
	1914— <i>contd.</i>
American Consul, Bombay . . .	Prices of Ghi from 1900 to 1914.
J. C. Mitra, Esq., Deputy Accountant-General, Bengal.	Prices of hides at Cawnpore, Calcutta, and Madras for three years.
Government of India, Department of Revenue and Agriculture.	Prices and freights of wheat from 1890-91 to 1913-14.
Military Accountant-General, Simla	Information relating to an estimate of probable expenditure for food charges of the Army during 1915-16.
	1915.
Deputy Director, Royal Indian Marine, Calcutta.	Prices of miscellaneous stores and provisions and hospital necessaries.
Government of India, Department of Commerce and Industry.	Prices of peas in India in connection with a question in the Imperial Council.
Ditto . . .	Prices of wheat in India in connection with a question in the Imperial Council.
E. C. Cotes, Esq., Bengal Club, Calcutta.	Enquiry regarding world's wheat prices.
Director General of Commercial Intelligence, Calcutta.	Prices of hides and skins in the Punjab from July 1914 to January 1915.
L. L. Fermor, Esq., Geological Survey, Calcutta.	Freights of Manganese Ore from Bombay and Calcutta for six years.
H. Stanley Jevons, Esq., Professor of Economics, Allahabad University.	Information regarding the effect of war on prices in India.
H. A. F. Lindsay, Esq., Department of Commerce and Industry.	Prices of saltpetre in Calcutta.
Messrs. Behari Lal Bishambar Dass, Ambala.	Prices of food-stuffs in Calcutta in comparison with those before the outbreak of war.
Harris Brothers, Perth, Australia (through Revenue and Agriculture Department).	Prices of compressed wheaten hay shipped from India to Fremantle.
President, International Institute of Agriculture, Rome.	Prices of certain staple commodities of trade and consumption in India during 1913 and 1914.
R. N. Sen, Esq., Professor, Engineering College, Sibpur.	Prices and freights of certain chemicals in Calcutta.
Hon'ble Mr. L. J. Kershaw, C.I.E., Secretary, Revenue and Agriculture Department.	Information regarding difference of price between Karachi and Bombay wheats and one or two leading American and Canadian qualities during a few months in normal years.
Rev. E. R. Fitch, Etawah . . .	Prices of foodstuffs and other articles in the United Provinces and the Punjab during 5 years.
H. A. F. Lindsay, Esq., Commerce and Industry Department, Simla.	Index Numbers representing monthly variations in Indian Freight levels since the outbreak of war.
Wheat Commissioner, Bombay . . .	Prices of wheat in India from 1898 to 1914.

SELECTED ENQUIRIES RECEIVED IN THE DEPARTMENT OF STATISTICS—*contd.*

From whom received. .	Subject.
<i>Prices and Wages—contd.</i>	
1915— <i>contd.</i>	
Department of Commerce and Industry, Simla.	Prices of foodstuffs in connexion with a question in the Imperial Council by the Hon'ble Maharaja Ranjit Singh of Nashipur.
Ditto . . .	Information regarding the wheat position in India.
Ditto . . .	Information about the prices of cutch as compared with those in normal times.
Ditto . . .	Information as to the movement of wheat prices in the United Kingdom.
Ditto . . .	Prices of Bikaner wool.
Ditto . . .	Prices of Thibetan wool.
Ditto . . .	Prices of oilseeds and jute from January 1912 to July 1914.
Ditto . . .	Prices of Mica since the outbreak of war.
1916.	
Department of Commerce and Industry, Simla.	Wholesale prices of foodgrains—cereals and pulses—required in connexion with a question in the Imperial Legislative Council.
Department of Revenue and Agriculture, Government of India.	Information about the prices of cotton in view of Mr. Todd's criticism and preparation of cotton charts showing weekly prices of Indian and American cotton from January 1914 to May 1916.
Department of Commerce and Industry, Government of India.	Prices of Madras tanned goat skins as compared with those in 1913, 1914 and 1915.
J. A. Hubback, Esq., Magistrate and Collector, Gya.	Information regarding prices of chief articles of trade and consumption required in connexion with Income Tax Assessments.
American Consul-General, Calcutta .	Information regarding cotton seed industry in India.
Revd. E. R. Fitch, Etawah . . .	Information about the prices of ghi, mustard oil and mutton in the United Provinces and the Punjab and also of salaries of peons in offices, military horse keepers, vernacular school masters, etc.
Agricultural Chemist, Punjab (through Department of Commerce and Industry).	Prices of Java and Beet Sugar at Karachi for the years 1911 to 1915.
Controller of Currency, Calcutta .	Prices of copper in London from March to July 1916.
B. B. Ghosh, Esq., Konnagar . . .	Prices of Manganese Ore in India and London for ten years.
Traffic Manager, Eastern Bengal Railway.	Prices of Jute in Calcutta from 1911 to 1914.
N. N. Dutta, Esq., Calcutta . . .	Prices of Coal at Karachi from 1909 to 1911.
A. Barrie Brown, Esq., Editor, "Commerce," Calcutta.	Prices of Coal at Calcutta from 1913 to 1915.

SELECTED ENQUIRIES RECEIVED IN THE DEPARTMENT STATISTICS—*contd.*

From whom received.	Subject.
<i>Prices and Wages—concl.</i> 1916— <i>contd.</i>	
W. Booth-Gravelly, Esq., I.C.S., officer on special duty, Home Department.	Statistics of house rents in the Indian and European quarters in Calcutta and Bombay.
Messrs. Hoare, Miller & Co., Calcutta	Wages of unskilled labour in the United Provinces and the Madras Presidency during 1908, 1913 and 1914.
<i>Public Health, Administrative, Judicial, Local Self-Government and Education.</i>	
1914.	
Lieut.-Colonel W. J. Buchanan, Calcutta.	Statistics of Insanity in India.
Ditto	Lunacy Statistics in European countries.
1915.	
Director-General of Statistics, Portugal.	Statistics of population according to sex, distinguishing the illiterates.
The Publishers' Association of Great Britain and Ireland, Bombay.	List of Books published in India in English and Vernacular.
Editor, "Rangoon Times," Rangoon.	Enquiry regarding the cost of the blocks of the diagrams for literacy in the Education Volume and its publication in the "Rangoon Times".
C. C. Conry, Esq., Calcutta	Statistics of the domiciled community in Bengal and in India.
1916.	
Padam Sain Jain, Esq., Allahabad	Statistics of pauperism in India.
Richards Burges, Esq., Jubbalpore	Statistics of villages in the Indian Empire.
Ditto	Statistics of villages in the Indian States.
R. H. McClure, Esq., California, United States of America.	Enquiry regarding the publication of the statistics relating to area and population of the various provinces and Native States in India.
S. Makbul Ahmed, Esq., Meerut	Statistics of Muhammadans in India.
Messrs. Chatterjee, Ganguly & Co., Calcutta.	Statistics of average death rate in India according to age.
E. N. Blandy, Esq., I.C.S., Calcutta.	Statistics of Doctors and Druggists of all kinds in Scotland.
N. Ganguly, Esq., Calcutta	Statistics of population, revenues and prices, etc.
Ditto	List of publications of the Department of Statistics.
Dr. Devaprasad Sarvadhikary, Senate House, Calcutta.	Educational Statistics.
R. N. Gilchrist, Esq., Krishnagar College.	Educational and other statistics.
<i>Imperial Inland Trade.</i>	
1914.	
Department of Commerce and Industry, Government of India.	Figures of imports and exports of wheat into and from each province during 1913-14.
Ditto	Exports of wheat from the Punjab during the six months ending 30th September 1914, compared with the corresponding period of the previous year.

SELECTED ENQUIRIES RECEIVED IN THE DEPARTMENT OF STATISTICS—*contd.*

From whom received.	Subject.
<i>Imperial Inland Trade—contd.</i>	
1915.	
Director of Industries, United Provinces.	Exports of wheat and oilseeds from the United Provinces to other provinces, Native States and Chief Sea Ports by rail and river during the five years ending 1913-14.
Deputy Commissioner, Lyallpur	Exports of wheat by rail and river from the internal blocks of the Punjab, the United Provinces, the Central Provinces and Sind to all external blocks, for four years ending 1913-14.
Bisra Stone Lime Company, Limited, Calcutta.	Figures of imports by all routes into Calcutta of Chalk and Lime for three years ending 1913-14; imports and exports by rail and river into and from Bengal, Bihar and Orissa, the United Provinces and the Central Provinces.
1916.	
Director of Industries, United Provinces.	Exports of wheat from the United Provinces to other provinces, Native States and Chief Sea Ports by rail and river during three months April to June, 1913, 1914, and 1915.
Department of Commerce and Industry, Government of India.	Value of the total import and export trade of the provinces of Bihar and Orissa, the United Provinces and the Punjab during the three years 1913-14, 1914-15 and 1915-16.
B. B. Ghosh, Esq., Konnagar	Exports of Manganese Ore from the Central Provinces and Berar during the years 1910-11 to 1914-15.
<i>Inland and Frontier Trade of Bengal.</i>	
1914.	
Collector of Customs, Calcutta	Statistics of import and export into and from the Calcutta trade block and Bengal of coal and coke, cotton piece-goods, jute manufactures, tea, etc., during the calendar year 1913.
Bengal Chamber of Commerce, Calcutta.	Statistics of gunny bags and cloths.
Messrs. Lipton & Co., Bombay	Import of tea into Bombay from April to the end of December 1913.
C. I. Zobell, Esq., Calcutta	Statistics of trade in principal commodities imported into and exported from the Calcutta block by cart along the Diamond Harbour Road during the year 1913.
Commissioner, Northern India Salt Revenue, Agra.	Import and export trade of saltpetre into and from Calcutta by sea and land for the year 1913-14.
Ditto	Statistics of import and export of salt into and from Bengal during the year 1913-14.
Political Officer in Sikkim	Total figures of export and import trade between Bhutan and British India during 1912-13 and 1913-14.
Commissioner of Excise and Salt, Bihar and Orissa.	Statistics of salt imported into and exported from each district in the Province of Bihar and Orissa.

SELECTED ENQUIRIES RECEIVED IN THE DEPARTMENT OF STATISTICS—*contd.*

From whom received.	Subject.
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Inland and Frontier Trade of Bengal—contd.

1914—*contd.*

Imperial Agricultural Chemist, Pusa.	Statistics of sugar imported into and exported from the North-West Frontier Province during 1912-13.
Political Officer in Sikkim . . .	Statistics of import and export trade between British India and Sikkim during the year ending 31st March 1914.
J. A. L. Swan, Esq., I.C.S., Calcutta.	Import into and export from Calcutta of raw hides by all routes from 1909-10 to 1913-14 and in the three months April to June 1914.
Commissioner of the Rajshahi Division.	Statistics of import and export of rice and jute between the districts of the Rajshahi division.
A. Duncan, Esq., Agent office, Bengal Nagpur Railway, Calcutta.	Statistics of import into and export from Calcutta by boat (river and canal), steamer and rail of certain selected articles from and to the district of Midnapore for twelve months, October 1913 to September 1914.

1915.

Collector of Customs, Calcutta . . .	Statistics of import and export into and from the Calcutta trade block and Bengal of coal and coke, cotton piece-goods, jute manufactures, tea, etc., during the calendar year 1914.
Financial Department, Government of Bengal.	Production and consumption of wheat.
Commissioner of Excise and Salt, Bengal.	Statement showing the salt trade in the Presidency of Bengal by rail, road, etc., with other provinces and frontier countries in India during 1914-15.
Commissioner, Northern India Salt Revenue, Agra.	Import and export trade of saltpetre into and from Calcutta during 1914-15.
Political Officer in Sikkim . . .	Total export and import trade between Bhutan and British India for 1913-14 and 1914-15.
R. Chakravarty, Esq., Kustia . . .	Statistics of import and export of Indian and Foreign piece-goods into and from Calcutta during the years 1912, 1913 and 1914.
Accountant-General, Bengal . . .	Quantities of the principal staples of traffic imported into and exported from Calcutta.
Commissioner, Northern India Salt Revenue, Agra.	Statistics of import and export of salt for the year 1914-15.
Political Officer in Sikkim . . .	Import and Export trade between Bengal and Sikkim for the year 1914-15.
Director of Agriculture, Bihar and Orissa.	Exports of gram and pulse and other foodgrains carried over the East Indian, Eastern Bengal, and the Bengal Nagpur Railways during the months of April to October of the last three years.

SELECTED ENQUIRIES RECEIVED IN THE DEPARTMENT OF STATISTICS—*contd.*

From whom received.	Subject.
<i>Inland and Frontier Trade of Bengal—concl'd.</i>	
1916.	
Collector of Customs, Calcutta	Statistics of import and export into and from the Calcutta trade block and Bengal of coal and coke, cotton piece-goods, jute manufactures, tea, etc., during the calendar year 1915.
Commissioner, Northern India Salt Revenue, Agra.	Statistics of import into and export from Bengal of salt during the year 1915-16.
Commissioner of Excise and Salt, Bengal.	Statement showing the salt trade in the Presidency of Bengal by rail and road and river with other provinces and frontier countries in India during 1915-16.
Political Officer in Sikkim	Statement of export and import trade between Sikkim and Bengal for the year 1915-16.
Ditto	Total import and export trade between Bengal and Sikkim during the years 1906 to 1910.
Commissioner, Northern India Salt Revenue, Agra.	Statistics of import and export trade of saltpetre into and from Calcutta by sea and land for the official year 1915-16.
J. C. K. Peterson, Esq., I.C.S., Calcutta.	Statistics of imports into and exports from Calcutta of raw hides and tanned or half tanned leather and also the names of the places from which these are imported into Calcutta.
<i>Commercial Statistics.</i>	
1914.	
P. N. Dutt, Esq., London	Imports of Aluminium into British India.
F. W. Barlow, Esq., Calcutta	Imports of English and German bottled beer into India during 1913.
Superintendent, Royal Botanic Gardens, Calcutta.	Imports of Quinine by countries during the years 1910 to 1913, also the share of each province.
Entomologist, Baroda State	Quantity and value of export of (a) lac, (b) honey, (c) wax and (d) silk from the various provinces during 1912-13.
Singer Manufacturing Company, Madras.	Receipts under the following revenue heads during 1912-13 :—(a) Customs, (b) Income-tax, (c) Income-tax per head of population, (d) total value of goods imported into Bengal, Bombay, Burma, and Madras.
Messrs. Tata Sons & Co., Bombay	Imports of steel billets for 5 years—quantity and value, countries of origin, ports at which received, also distribution of billets to the interior from receiving ports.
Settlement Commissioner, Nagpur	Total export of linseed from India during 1913-14.
F. Gösling, Esq., Commercial Attaché to the German Consulate-General, Calcutta.	Export figures (weight and value) of Kapok during 1912-13 and 1913-14.
Ditto.	Amount of coke shipped from Calcutta to Indian ports during the last three years.

SELECTED ENQUIRIES RECEIVED IN THE DEPARTMENT OF STATISTICS—*contd.*

From whom received.	Subject.
<i>Commercial Statistics—contd.</i>	
1914— <i>contd.</i>	
A. Burrup, Esq., Assistant Collector of Customs, Calcutta.	Exports of tea from China and Formosa during 1913.
A. S. Durmalinga Mudaly, Esq., Arcot.	Imports of eggs into Rangoon from India.
Secretary, Indian Merchants' Chamber and Bureau, Bombay.	Names of ports to which chasam or waste silk is exported from India.
Consul-General for France, Calcutta.	Annual statistics of entries into India of motor vehicles by countries of origin; showing number of cars.
American Consul-General, Calcutta.	Imports and exports of Gold and Silver into British India during the calendar year 1913.
Messrs. Rolls-Royce, Limited, Bombay	Imports of motor cars, motor cycles, and parts thereof during 1913-14, showing separately number and value and specifying imports from the United Kingdom.
Ditto	Imports of rubber tyres for motor cars and motor cycles during 1913-14.
Ditto	Monthly imports from April to August 1914 of (a) number and value of tyres for motors and motor cycles imported, (b) number and value of tubes for motor tyres imported, and (c) share of each country whence imported.
C. Nobokoff, Esq., Consul-General for Russia, Simla.	Imports by countries of the different descriptions of timber and railway sleepers during 1912-13 and 1913-14.
Consul-General for Italy, Calcutta.	Value of total imports into India from Italy and from some other principal countries with the corresponding percentage shares.
Bengal Chamber of Commerce, Calcutta.	Consumption of soda ash and caustic soda in India during 1912-13.
E. Digby, Esq., Associated Press	Importation of motor cars into India.
Inspector-General of Forests	Quantity and value of the different descriptions of wood timber imported by sea in 1913-14.
Forest Economist, Dehra-Dun	Quantity and value of teak wood and other timber exported during 1913-14.
Director of Agriculture, Bengal	Export of bonemeal from Calcutta and India for ten years.
Railway Department, Railway Board, Government of India.	Quantity of foreign coal, coke and patent fuel imported into India from (1) United Kingdom and (2) from other countries during 1913-14.
Messrs. David, Sassoon & Co., Ltd., Calcutta.	Imports into Calcutta of rice from Burma and maize from Java during 1913 and first half of 1914.
Cox's Shipping Agency, Ltd., Calcutta	Imports of phosphates into India.
Cheeka Luxminarayan, Cocanada	Monthly exports of rice from Calcutta. Exports of castor seed.

SELECTED ENQUIRIES RECEIVED IN THE DEPARTMENT OF STATISTICS—*contd.*

From whom received.	Subject.
<i>Commercial Statistics—contd.</i>	
1914— <i>concl'd.</i>	
Director, Geological Survey of India	Figures of Re-exports of coal, coke, and patent fuel to foreign countries for the Quinquennial Review.
Ditto	Imports into India of iron and steel materials during the calendar years 1909 to 1913 for the Quinquennial Review of Mineral Production.
E. J. Frewen, Esq., Calcutta	Imports of Asphalt into British India with the shares of each maritime province.
Director, Geological Survey of India	Forwarded certain typewritten sheets from the Bureau of Statistics, Philadelphia, for inserting figures concerning the import, export and production of coal, iron, manganese, etc.
1915.	
Leyland and Birmingham Rubber Company, Limited, Calcutta.	Imports of manufactured rubber goods.
Arthur Jacob, Esq., London	Imports of Aluminium during each month April to November 1914 and 1912-13 and 1913-14.
Forest Economist, Dehra-Dun	Number and value of tea-boxes of wood and metal imported by sea into Assam.
Secretary to the Board of Revenue, United Provinces.	Statistics of imports into British India for two years of Morphine pure and other allied drugs.
Messrs. Ewing and Company, Ltd., Calcutta.	Details of imports into India of Buttons.
Director, Geological Survey of India	Imports of Sulphate of Ammonia and Super-Phosphates.
Director of Industries, United Provinces, Cawnpore.	Imports of Oxide of Cobalt.
Ditto	Imports of Plaster of Paris.
Ditto	Exports of crushed food for horses and cattle.
The India Rubber Guttapercha and Telegraph Works Company, Limited, Calcutta.	Imports of Cycles, Motor-Cycles, and Motor Car Tyres.
E. Sequeira, Esq., Custom House, Rangoon.	Imports of rice into Cuba.
F. W. Barlow, Esq., Calcutta	Statistics of the imports of bottled beer.
Deputy Conservator of Forests, Nainital Division.	Imports of rosin and turpentine.
Messrs. Osman Jamail and Company, Calcutta.	Export of gunny bags and hessian cloth from Calcutta.
H. B. Tilden, Esq., Poste Restante, Bombay.	Imports of Quinine into India from Java and the Straits Settlements from April 1914 to February 1915.
Director of Geological Survey of India.	Form in which copper is imported and figures of imports of copper.
Department of Commerce and Industry, Government of India.	Exports of raw wool to the United Kingdom and other countries.

SELECTED ENQUIRIES RECEIVED IN THE DEPARTMENT OF STATISTICS—*contd.*

From whom received.	Subject.
<i>Commercial Statistics—contd.</i>	
1915— <i>contd.</i>	
India and Colonial Investments, Limited, Delhi.	Figures of German and Austrian total trade.
Bhavnagar Chemical Works, Kathiawar.	Quantities of annual imports of Cream of Tartar, Tartaric Acid, and Baking powder.
The Calcutta Pottery Works, Calcutta.	Imports of China Clay during 1912-1914.
The Chamber of Commerce, Bombay.	Consumption of rape and mustard seed in India.
American Consul-General, Calcutta.	Imports into and exports from India of gold and silver for the calendar year 1914.
Messrs. Rolls-Royce, Limited, Bombay	Imports into India during each month of 1914-15 of tyres for motor cars and tubes for motor tyres.
Superintendent, Industrial Education, Madras.	Shipment of Bauxite from India.
Consul-General for Netherlands, Calcutta.	Countries to which Djatti (teak) wood was exported..
Director, Geological Survey of India.	Imports of Pig Iron during 1909.
American Consul-General, Calcutta.	Imports into India of cotton linters, cotton batting, and cotton waste.
Economic Botanist to the Government of the United Provinces.	Monthly figures of the amount of barley shipped from the main ports and source of that barley.
The Gauri Gold and Silver Works Company, Surat.	Imports of gold thread, gilt silver wire and other tin-sels included in "Lametta".
Christie White & Co., Calcutta.	Imports of China Clay during 5 years.
P. N. Dutt, Esq., Calcutta.	Statistics of the different sizes of steel plates, sheets and hoops imported into Calcutta during ten years.
W. J. Burn & Co., Calcutta.	Detailed figures of cotton exports from Calcutta for the year August 1914 to July 1915.
Jal. F. Karain, Esq., Nagpur.	Full statistics of the imports of iron and steel.
Forest Economist, Dehra Dun.	Exports of teak wood and other timber during 1914-15.
Inspector-General of Forests.	Imports of wood and timber into British India during 1914-15.
District Officer, Meerut.	Exports of oilseeds from India.
Traffic Manager, Eastern Bengal State Railway.	Despatches of Rangoon rice and paddy.
The South British Insurance Company, Limited, Bombay.	Details of the imports and exports from and to Basra and the other Persian Gulf ports during the last few years.
Captain A. M. Cardew.	Total exports of Indian Merchandise and total imports of Foreign Merchandise for 1914-15—Japan, Germany, Austria-Hungary, France, etc.

SELECTED ENQUIRIES RECEIVED IN THE DEPARTMENT OF STATISTICS—*contd.*

From whom received.	Subject.
<i>Commercial Statistics—contd.</i>	
1915— <i>concl'd.</i>	
Captain A. M. Cardew . . .	Total imports and exports into and from British India by countries in the first six months of 1914-15.
Messrs. Tata Sons & Co., Bombay .	Total imports into India and Calcutta of the different descriptions of cast iron pipes.
D. H. Wadia, Esq., Nagpur . . .	Suggestion regarding the inclusion of statements showing the monthly and running totals of the aggregate exports from and imports into British India to and from the various foreign countries.
Messrs. Gramophone Co., Limited, Calcutta.	Number of talking machines imported and number of records imported.
Messrs. Speyer & Co., Calcutta .	Number and value of motor cars imported into Calcutta during 1913-14 and 1914-15.
French Motor Car Co., Calcutta .	Whether cars of French make imported into India from Antwerp are shown as French cars or Belgian cars.
Messrs. Shaw, Wallace & Co., Calcutta	Imports of Sulphate of Ammonia into the various ports in India during 1914, also the countries whence imported.
1916.	
H. B. Tilden, Esq., Calcutta . . .	Imports of Quinine and its alkaloids month by month from England, Holland, America, Java and other sources.
Messrs. Rolls-Royce, Ltd., Bombay	Imports of (1) motor cars and motor cycles showing number, value and country of origin, (2) tyres for motor cars and motor cycles showing prices of tyres, country of origin, and total value, also similar information in respect of rubber tubes for motor tyres.
B. Kirkpatrick, Esq., Calcutta .	Imports into Calcutta for past three years of tea chests or tea shooks—quantity and value, also country of origin.
N. N. Godbole, Esq., Lahore . . .	Exports of graphite from British India during 1913-14, 1914-15—quantity, prices, sources, etc.
P. Scofield Thomas, Esq., London .	A return of the imports of tubes and fittings, wrought, month by month from each of the "other countries" shown on page 44 of the monthly Sea-borne trade Accounts.
F. W. Barlow, Esq., Calcutta .	Enquiry regarding figures of and suggestion regarding separate specification of bottled beer and stout and porter in the Sea-borne trade returns.
Bhavnagar Chemical Works, Kathiawar.	Quantity and value of commercial Nitric Acid, Sulphuric Acid, and Hydrochloric Acid imported during 1913, 1914, and 1915.
W. M. Burslam, Esq., Calcutta .	Quantity and designation of cotton piece-goods imported from Japan from September 1915 to February 1916.
American Consul-General, Calcutta .	Imports into and exports from India of gold and silver during the calendar year 1915.
B. B. Ghosh, Esq., Konnagar .	Imports and exports of cement into the Presidency of Bengal. Annual consumption of coal in Assam and East Bengal.

SELECTED ENQUIRIES RECEIVED IN THE DEPARTMENT OF STATISTICS—*contd.*

From whom received.	Subject.
<i>Commercial Statistics—concl'd.</i>	
1916— <i>contd.</i>	
The Co-operative Wholesale Society, Ltd.	Report giving particulars of oilseed trade and oil industry of India in 1915.
Railway Department, Railway Board, Government of India.	Imports of coal, coke, etc., during 1915-16 on private and Government account.
Principal, Poona Agricultural College	Details of exports and imports of different kinds of manures.
Sir Sydney Burrard, Simla	How much copper is annually imported into India for manufacture and how much is produced, also information about exports.
Agricultural Institute, Rome	Exports of fertilisers—first half of 1916.
Director-General of Commercial Intelligence.	Imports of whale oil into British India during the years 1913-14, 1914-15, and 1915-16.
F. Leach, Esq., Mirzapore	Exports of shellac from Calcutta to the different countries for the six months ending June 1915 and 1916.
Geological Survey of India	Coal exports to Indian ports during three calendar years 1913, 1914, and 1915.
K. B. Chaudhury, Esq., Calcutta . .	Quantity of glazed tiles (wall and flooring) imported in 1913, 1914, and 1915 into Bengal.
Consul-General for Japan, Calcutta .	Imports of talking machines during the three months April to June 1916.
Consul for Belgium, Bombay	An advance proof of the table relating to imports from and exports to Japan.
Peter, Spence & Sons, Limited, London.	Imports of Alum and Sulphate of Ammonia from Japan since the beginning of war.
Leyland and Birmingham Rubber Co., Ltd., Calcutta.	Imports into Calcutta and Rangoon of (1) belting for machinery ; (2) packing engine and boiler ; (3) rubber tyres during April to September 1916.
Stewarts and Lloyds, Ltd.	Wrought Iron Steel Tubes, pipes, and fittings imported into India.
<i>Frontier Land Trade.</i>	
1914.	
Engineer-in-Chief, E. B. S. Railway	Statistics of trade of Bihar and Orissa with Nepal for the year ending 31st March 1916.
Political Officer in Sikkim	Figures of trade between Bhutan and British India for 1912-13 and 1913-14.
Director of Agriculture, Bengal . .	Figures showing quantities of jute imported into Bengal from Nepal during 1913-14.
Political Officer in Sikkim	Enquiry regarding the decrease in the trade between Bhutan and British India.
<i>Agriculture.</i>	
1914.	
President, Statistics Office, Berlin .	Certain statistics relating to cultivation, crops and livestock in India.
H. Diederichsen & Co., Hamburg .	Certain information about sesamum, linseed and cotton crops.

SELECTED ENQUIRIES RECEIVED IN THE DEPARTMENT OF STATISTICS—*contd.*

From whom received.	Subject.
<i>Agriculture—contd.</i>	
1914— <i>contd.</i>	
Commercial Intelligence Branch of the Board of Trade, London.	Production of Cotton in India during 1913-14.
Agent, Bengal Nagpur Railway, Calcutta.	Production of cotton, wheat, etc.
Principal, Dacca College . . .	Statistics of rainfall and river level of Bengal from 1875 to 1912.
American Consul-General, Calcutta .	Certain information relating to cultivation of Tinnevelley Senna.
Revenue and Agriculture Department, Government of India.	Information regarding sowings, area sown, and exportable surplus of wheat.
Messrs. Anderson, Wright & Co., Calcutta.	Condition of the rice crop in Bengal.
A. D. Auddy, Esq., Calcutta . . .	Condition of winter rice in certain districts in Bengal, Bihar and Assam.
International Institute of Agriculture, Rome.	Organisation of the system of collection of agricultural statistics in India.
1915.	
Commerce and Industry Department, Government of India, Simla.	Actual outturn of Indian Sugar during 1913-14.
Messrs. Begg, Dunlop & Co., Calcutta	Production and consumption of Indigo before the outbreak of war.
J. MacKenna, Esq., I.C.S. . . .	Total value of agricultural produce in India.
American Consul-General, Calcutta .	Production, imports and exports of rice in British India.
Revenue and Agriculture Department, Government of India.	Area under tea and jute in North and East Bengal and Assam.
B. J. Padshah, Esq., Bombay . . .	Information about coconuts and groundnuts.
Messageries Maritimes S. N. Co., Ltd., Calcutta.	Area under jute in India for 1914-15.
Commercial Intelligence Branch of the Board of Trade, London.	Production of cotton in India in 1914-15.
Chilean Nitrate Propaganda, Calcutta	Acreage under wheat and cotton in India for 1914-15.
Lala Panna Lal, Ambala . . .	Area and yield of wheat in each province in India during the last ten years.
American Consul-General, Calcutta .	Annual production and approximate consumption of tobacco in India.
American Consul, Bombay . . .	Estimates of Area and Yield of cotton crop in India for 1912-13 to 1914-15.
Arracan & Co., Ltd., Calcutta . .	Prospects of rice and foodstuffs in India.
Volkart Brothers, Beawar . . .	Area under cotton for 1914-15 in the different States of Rajputana.
American Consul-General, Calcutta .	Acreage and production of edible beans in India.

SELECTED ENQUIRIES RECEIVED IN THE DEPARTMENT OF STATISTICS—*contd.*

From whom received.	Subject.
<i>Agriculture—concl'd.</i>	
1915— <i>contd.</i>	
Volkart Brothers, Beawar . . .	Area under cotton in all the States of Rajputana and all the districts of Ajmer-Merwara.
Commerce and Industry Department, Government of India.	Certain information regarding Bikaner wool.
Volkart Brothers, Bombay . . .	Acreage under cotton in Hyderabad, and in each district of the Deccan and Karnatak divisions of Bombay.
Lipton, Limited, Calcutta . . .	Coffee cultivation in India.
1916.	
Consul for Japan, Bombay . . .	Area and yield of ginger in India for the last 5 years.
Buldeodass Jugalkisore, Calcutta . . .	Acreage and prospects of linseed, wheat, rice, etc.
Tata Sons & Co., Bombay . . .	Area and yield of ginger in India for the last three years.
Secretary, Indian Merchants Chamber and Bureau, Bombay.	Production and area of ginger crop.
Wheat Commissioner, India . . .	Information regarding Mohwa flower.
Secretary, Bengal Chamber of Commerce, Calcutta.	Area sown with indigo.
Sadiram Gangaprasad, Calcutta . . .	Certain information about wheat.
Mr. V. K. Sarma, Berar . . .	Certain information regarding cotton.
Acting Consul for France, Bombay . . .	Information about fennel, cummin, and coriander crops.
Financial Department, Government of Bengal.	Annual consumption and production of sugar in Bengal.
Volkart Brothers, Beawar . . .	Acreage under cotton crop of 1916-17 in Rajputana and Ajmer-Merwara.
Bombay House Agency, Bombay . . .	Information regarding cultivation of cotton and oil-seeds in India.
Fibre Expert to the Government of Bengal.	Areas under jute, <i>aus</i> rice and <i>aman</i> rice in each of the large jute-growing districts for the last 20 years.
<i>Financial and Industrial.</i>	
1914.	
Sir Robert Carlyle, K.C.S.I. . . .	Estimate of cotton cloth manufactured in India outside mills.
Thacker, Spink & Co. . . .	Prices of Silver, Exchange, and imports and exports of gold and silver.
1915.	
P. Sen and Brothers, Dacca . . .	Value of paper produced in Indian Mills.
Editor, "Paper Makers' Directory," London.	Information regarding paper mills in India.

SELECTED ENQUIRIES RECEIVED IN THE DEPARTMENT OF STATISTICS—*concl'd.*

From whom received.	Subject.
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*Financial and Industrial—cont'd.*1915—*cont'd.*

C. Hayavadum Rao, Bangalore	Absorption of gold in India.
Director, Geological Survey of India	Consumption of coal and wood on Indian Railways.
Vidyasagar Pandya, Madras	Names of Exchange and Joint Stock Banks in India.
Commerce and Industry Department, Government of India.	Output and exports of Petrol and Benzine.

1916.

Editor, "Paper Makers' Directory," London.	Names of paper pulp and board mills in India.
Accountant-General, Bombay	Certain figures regarding registered debt of India.
K. L. Datta, Esq., Mysore	Presidency Bank rates.
Proprietors, "Statesman"	Collection of Income tax in Bombay.
K. B. Chowdhury, Calcutta	Names and addresses of Indian tea gardens and collieries.
B. Chowdhury, Calcutta	Names and addresses of Joint Stock Companies.
Controller of Currency	Deposits in exchange Banks.
Commerce and Industry Department, Government of India.	Output and export of Petrol and Benzine.
Indian Mining Association, Calcutta	Supply of coal in India and prices of Bengal coal.
Professor M. L. Tannan, Bombay	Details of deposits held by Banks.
Surendra Nath Dhar	Raw materials used in industries in Assam.
Director of Agriculture, Bengal	Number of operatives, looms, and spindles and capital employed in jute mills in Bengal.

NOTE ON THE COMMERCIAL INTELLIGENCE DEPARTMENT OF THE
BOARD OF TRADE.

GENERAL SUMMARY.

PARAS.

1. Origin and purpose	2 & 3
2. Nature of information collected	4 & 5
3. Sources of information	6
(a) His Majesty's Trade Commissioners and Imperial Trade Correspondents.	
(b) His Majesty's Embassies, Legations, Commercial Attachés, and Consuls.	
(c) Honorary Correspondents.	
(d) Official and Non-Official Publications.	
4. Distribution of information	7
(a) By replies to enquiries.	
(b) By general publications.	
(c) To Chambers of Commerce and individual firms confidentially.	
(d) By exhibition of Samples.	
5. The Advisory Committee	8
6. General points connected with the Department including the arrangement made before the outbreak of war between the Foreign Office and the Canadian Government as to the utilisation of the Consular Service	9

This memorandum deals with the Commercial Intelligence Department of the Board of Trade to which I was for sometime attached when at the Board in 1913. It does not refer to the office of the Director General of Commercial Intelligence, India. It is perhaps of some interest and importance to analyse the methods of the Board of Trade in regard to Commercial Intelligence.

2. The Commercial Intelligence Department has recently been formed, with a view to improving the organization for assisting British trade by collecting and disseminating information, by the amalgamation of the Commercial Intelligence Branch and the Exhibitions Branch of the Board of Trade. It has been placed under a Comptroller-General (Sir William Clark, K.C.S.I., C.M.G.). The Commercial Intelligence Branch was established in 1899 as a result of the report of a Committee appointed by the Board of Trade in 1897 to enquire into and report upon "the dissemination of commercial information, and the collection and exhibition of patterns and samples." The total cost of Commercial Intelligence including salaries and allowances, but excluding rent and other expenses, is over £20,000 a year. This sum does not include the salaries of the Central Board of Trade staff or of the Commercial Department of the Foreign Office or of the Diplomatic and Consular service. It includes the salaries of His Majesty's Trade Commissioners who are paid from £600 to £900 a year. The Civil Estimates for the year ending 31st March, 1917, give the following details regarding Trade Commissioners and Trade Correspondents :—

	SALARY OF OFFICE.			1916-17.
	Minimum.	Annual Increment.	Maximum.	
	£	£	£	£
3*Trade Commissioners	700	25	900	3,298*
1 ditto	600	25	800	810†
Remuneration and expenses of Commercial Correspondents in the Dominions and Self-governing Colonies, etc.	...	...	...	6,489
Remuneration of Local and Trade Correspondents	...	...	...	1,900
Total for Trade Commissioners and Correspondents	...	...	...	12,497

3. The Commercial Intelligence Branch is situated in the busiest part of the City, having been removed from Westminster in 1904. It is intended to be a centre at which information on all subjects of commercial interest can be obtained, and enquiries are replied to by the Branch with reference to openings for British trade abroad, general trade conditions in various countries, etc.

4. The scope of the information is wide, and the information deals with :—
- (1) Commercial Statistics.
 - (2) Names of firms abroad engaged in particular lines of business.
- (These lists of buyers of British goods abroad are prepared as carefully as possible by Trade Commissioners and Consular officers who do not, of course, include knowingly doubtful firms. These lists do not compete with private directories. It should also be mentioned that the department formally disclaims any responsibility in regard to the credit of the buyers who are included in the lists. It may be noted that the lists of firms abroad, although printed, are not supplied to chambers of commerce, but are kept for departmental convenience only. The reason is that many of the chambers of commerce have not the means of discriminating between those members to whom the lists could be safely given and those from whom they should be withheld, *e.g.*, firms which are agents for foreign manufacturers. If this information is supplied to chambers of commerce there would be other institutions, agencies, and bureaux, which would claim similar treatment.)
- (3) Contracts, both foreign and colonial, open to tender and similar openings for British trade;
 - (4) Tariffs and Customs Regulations—foreign and colonial.
 - (5) Regulations concerning commercial travellers and their samples.
 - (6) Laws affecting patents, designs, and trade marks in countries abroad.
 - (7) Certificates of Origin.
 - (8) Trade conditions in foreign countries, *e.g.*, means of recovery of debts, terms of payment, agencies, etc.
5. This information can be obtained at the offices of the branch, formerly known as "C. I. B.", without difficulty. The offices of the branch contain—
- (1) an enquiry room where enquiries can be made on various subjects dealt with by the Branch,
 - (2) a sample room for the exhibition of specimens of manufactured goods, which compete with British products in British Possessions or foreign countries, and of new materials which may be of interest to British manufacturers,

* Includes non-pensionable Personal Allowance of £300 per annum each.
† Includes non-pensionable Personal Allowance of £200 per annum.

- (3) a reading room where the latest official publications and the most recent commercial directories, year books, and a large number of trade journals may be consulted.

The strength of the Branch was, before the outbreak of war, as follows :—

Names section	9
Tariffs section	2
Enquiry room library, etc.	9
Journal and Commercial Statistical section	7
Special Register, Colonial and Consular Correspondence and correspondence with Trade Commissioners and Correspondents	9
Registry, etc., including typists	11
Director, one Chief Staff Officer, one Staff Officer	3
	50

On account of the special conditions created by the war the work of the Commercial Intelligence Branch has been recognised with the result that the staff of the Department of Commercial Intelligence has been increased to 160, part of which is on a temporary footing. Officers have been brought into the Department who are conversant with particular industries and with manufacturing processes employed in them and a special section of the office (the Home Section) has been created. The activities of the Foreign Samples Section and Foreign and Colonial Section have, in consistence with the present requirements of the commercial public, been extended.

6. The information collected by the Commercial Intelligence Department is obtained from a net work of sources.

- (I) His Majesty's Trade Commissioners and Imperial Trade Correspondents in Canada, Australia, New Zealand, and South Africa. There are 4 Trade Commissioners for the self-governing dominions and between 20 and 30 Imperial Trade Correspondents in addition to these Trade Commissioners. The Trade Commissioners give their whole time to the study of the trade conditions and requirements of their respective dominions. They watch foreign competition, and generally report fully to the Board of Trade on all matters affecting British trade in British dominions. The Trade Commissioners return generally every two years to the United Kingdom, when they visit the chief centres of trade for six months and interview British firms. The Commissioners are, therefore, kept acquainted with the needs of British firms and the development of British trade and industry. Individual firms in the United Kingdom can go to them direct in the same way as they would go to a Consul in a foreign country. These Trade Commissioners tour extensively throughout their respective dominions. They reply to all trade enquiries addressed to them by British firms, and they render assistance to the representatives of British firms in the dominion. These Trade Commissioners are, in fact, Government commercial travellers. I was told when in the "C. I. B." that Trade Commissioners had been instrumental in introducing Sheffield saws into Canada, English cocoa into South Africa, a certain line of cotton prints into South Africa, previously entirely held by Germans. They have also watched on behalf of the United Kingdom trade legislation in the dominions. The Imperial Trade correspondents are actively engaged in the trade of their own localities and are remunerated by annual fees from the Board of Trade. They answer enquiries from the "C. I. B." or from British firms direct and report on all matters likely to affect, if not already affecting, British trade. They send copies of all reports to the Trade Commissioners. These correspondents, in brief, work under the general supervision and guidance of the Trade Commissioners. Trade correspondents are appointed by the Board of Trade generally on the recommendation of the Trade Commissioner in each dominion.

- (II) His Majesty's Embassies, Legations, Commercial Attachés, and Consular Officers in foreign countries (directly or through the Foreign Office). Commercial information is furnished by this source usually in the following way. Replies to enquiries on ordinary commercial matters from firms in the United Kingdom would be forwarded through the Commercial Intelligence Branch of the Board of Trade, together with a duplicate copy for the use of the branch. Should the enquiry emanate from a firm in the dominions, a copy of the reply is sent to the dominion Government concerned as well as to the Commercial Intelligence Branch. If the enquiry is from a firm not in the United Kingdom and not in the dominions, a copy of the Consul's reply is sent to the Commercial Intelligence Branch, but in those cases Consuls are to use their discretion. It is well to bear in mind, however, in the case of enquiries originating from foreign countries, that foreigners frequently try to avail themselves of the machinery established for the benefit of the British traders, and that the interests of the British trade must alone be considered in replying to such of the enquiries of this kind as in the discretion of the Consular officer appear proper to be answered with a view to placing foreign customers in communication with the British firms. Specific requests from British traders which manifestly relate to the business of competing British firms would ordinarily be declined. The instructions, already given as to communi-

cating to the Foreign Office any particulars which may be of interest to it, apply to the cases mentioned above. In reply to enquiries by British importers for the names and addresses of British manufacturers of foreign goods, the information desired may be furnished in cases in which it is not considered likely to prove injurious to British manufacturing interests. The question of supplying or withholding information of this nature is generally left to the discretion of the Consular officer concerned, but the information is not withheld when the enquiry relates to any food product, or to articles which may be subjected to further processes of manufacture, or which may be for use in factories in the United Kingdom. If in doubt, the Consular Officer should refer to the Commercial Intelligence Branch of the Board of Trade before furnishing the information desired. In cases of applications from British firms in foreign countries and foreign firms abroad for the names of traders or buyers in the United Kingdom, the Consular Officer would, at his discretion, transmit the application to the Board of Trade for insertion in the "Board of Trade Journal", subject to the approval of the editor, who does not undertake any responsibility whatever with regard to the standing of any of his correspondents. The Consul answers, as completely as possible, enquiries made with a view to promoting British trade and commercial interests generally. It is no part of his official duty to give opinions or to furnish confidential information as to the respectability, private character or solvency of individuals or firms. He may, however, at his discretion make one of the following statements in reply to enquiries from British traders:—

- (1) That the firm is held in high repute, or is generally considered one of high standing.
- (2) That according to the information which it has been possible to obtain, the firm is respectable, though not in a large way of business.
- (3) That he regrets to be unable to furnish information on the subject. Whenever the names of firms are given, it is necessary to state that no responsibility can be accepted in respect of their financial standing. In this connexion an extract from a memorandum prepared by the Board of Trade is appended (Appendix I).

It will be clear then that a Consul shall reply to enquiries made with a view to promoting British trade. Correspondence, as Sir H. Llewellyn Smith pointed out to the Dominions Royal Commission, is encouraged, subject to the condition that it is generally better for a firm to apply to the Commercial Intelligence Branch which may have the information at hand and, therefore, save time to the enquirer.

- (III) A third source from which the information is drawn is the honorary correspondents in the Crown Colonies and Protectorates. There are 39 of these. The Governors of the Colonies not possessing responsible Government, and Protectorates, have each nominated an officer to act as honorary correspondent of the Commercial Intelligence Branch, and to answer trade enquiries addressed to him by the department or by British traders. There is also an arrangement between the Commerce and Industry Department of the Government of India and the Board of Trade by which the Director General of Commercial Intelligence of India acts as a correspondent of the Commercial Intelligence Department of the Board of Trade. Such enquiries as cannot be immediately answered by the Commercial Intelligence Branch or by the India Office are referred to that officer. This officer also sends to the Board from time to time any requests that may be received from Indian traders for the names of manufacturers of British goods.

- (IV) The fourth source is the information obtained from official publications of British, Colonial, and Foreign Governments as well as from non-official trade publications, etc. Appendices II and III state the number of reports received from His Majesty's Trade Commissioners and the Trade Correspondents and His Majesty's Diplomatic and Consular officers and the manner in which they were utilised, together with the number of enquiries received at the Commercial Intelligence Branch of the Board in 1912.

Proposals for the development of Trade Representation abroad are now under consideration by H. M.'s Government.

7. Next with regard to the distribution of information. The information which is distributed, for example, on commercial statistics, on foreign and colonial tariffs and Customs Regulations, on foreign and colonial contracts open to tender and other openings for trade, on articles competing with the United Kingdom goods in oversea markets and on products likely to be of use to manufacturers, and regarding firms abroad engaged in particular lines of business, etc., is supplied in the following ways:—

- (a) By replies to enquiries;
- (b) By general publications such as "the Board of Trade Journal" (which is issued weekly) and also by occasional publications, *e.g.*,—
 - (i) a memorandum summarising the regulations in force in the British Dominions and foreign countries with regard to commercial travellers, the license

duties to be paid (where such taxes exist), and the special Customs arrangements made and facilities granted, if any, in respect of commercial traveller's samples; and

(ii) a memorandum regarding Certificates of Origin.

(c) Dissemination otherwise than by formal or general publication, *e.g.*, to Chambers of Commerce and to individual firms confidentially. The names of individual firms known to be desirous of receiving information as to particular branches of trade are inscribed on the "Special Register" on payment of an annual fee of one guinea which includes the annual subscription to "the Board of Trade Journal." The admission to the Register is at the discretion of the head of the department. During 1912, 1,098 separate circulars were issued (to the number of 146,578 copies) to firms on this Register: during 1915, 849 separate circulars were issued (to the number of 383,888 copies); during 1916, 550 separate circulars were issued (to the number of 142,612 copies). The decline in 1916 is due to number of prohibitions and other Government restrictions on export.

(d) Samples. The samples received at the Commercial Intelligence Department consist almost entirely of foreign manufactured goods which compete with the United Kingdom trade in the self-governing dominions or other British Possessions, and of foreign manufactured goods and natural products which are sent by Consuls. There is no duplication of work between the Commercial Intelligence Department and the Imperial Institute, and arrangements have been made for co-operation between the two offices in respect of enquiries that may be made from time to time. The work of the Imperial Institute is mainly directed to the question of the development of the resources of the Empire in matters of raw products and materials, while the Commercial Intelligence Department is mainly directed to the promotion of the export trade of the United Kingdom in manufactured goods. The exhibition of samples has been extraordinarily popular with the trading community, and these samples have been much used in the centres of the particular industries, to which the Commercial Intelligence Department sent the collections.*

* Cf. the U. S. A. system.

8. The Advisory Committee to the Board of Trade on Commercial Intelligence was first established in May 1900 to advise the Board on the work of the Commercial Intelligence Branch, and on such other matters as the Board might refer to it. The Committee determines its own meetings and meets regularly on specified dates. Special meetings which may be summoned at any time, should occasion arise, take place in addition to these ordinary meetings. The Committee is purely an Advisory body. It does not actively direct the work of Commercial Intelligence, but it is generally consulted on questions of policy arising in connection with the work of Commercial Intelligence, *e.g.*, special commercial missions have been despatched by the Board of Trade on the recommendation of their Advisory Committee to enquire into the conditions and prospects of British trade in China (1915-16) and Russia (1916), and a mission to Spain and Portugal is at present under arrangement. It may also make any recommendation which it thinks fit with regard to the collection and dissemination of Commercial Intelligence. The average attendance of meetings is 18. There are 19 commercial members and 11 official members, 30 in all. Sir H. Llewellyn Smith in his evidence before the Dominions Royal Commission summarises the work of the Committee as follows:—

Firstly.—The object is to advise on the work of Commercial Intelligence, commercial missions abroad, and other matters.

Secondly.—The Committee may advise on such matters relating to foreign tariffs and to other commercial questions not included in the first head, as the Board of Trade may refer to them from time to time.

Thirdly and lastly.—The Committee may advise on any commercial question which may be submitted by one of the commercial members of the Committee, subject to previous approval by the Board of Trade.

The Board retains absolute freedom with regard to the adoption of recommendations of this or any other of the Advisory Committees, of which there are a number. A number of members of the Committee are also members of the Council of the Association of Chambers of Commerce, and the Chairman of the Council of the Association of Chambers of Commerce is on the Committee as a matter of course. The Committee, therefore, is a link between the Board of Trade and the Chambers of Commerce. The Chambers can be addressed directly, and the Chambers in their turn can address the Board direct if they care to do so, without reference to this Advisory Committee. It will be seen, therefore, that the Committee deals with such questions as, for example, the best means of collecting information, and making the best use for trade purposes of information collected; the revision of foreign tariffs and their prospective effect on British goods; and also with miscellaneous questions which come up from time to time. The majority of the questions, however, refer to tariffs and commercial intelligence. The Advisory Committee may take evidence by calling witnesses but it usually circularises and gets information. It is an expert Committee which advises the Board from its own knowledge. The 19 commercial members are carefully selected and represent big branches of trade in which they are experts. They do not act as delegates, but are rather a

combination of a great amount of commercial knowledge. The dominions are represented on the Advisory Committee of Commercial Intelligence, although they do not pay anything towards the cost of or give assistance to the Commercial Intelligence Department.

9. Lastly, it may be necessary to emphasize one or two points connected with the Commercial Intelligence Department.

- (1) The duties of the branch are concerned primarily with external trade.*
- (2) The interest of the producer, other things being equal, is given preference to that of the merchant or carrier where these are in conflict.
- (3) It does not assist importers of foreign goods excepting so far as those goods and materials are for industry or for use in factory.
- (4) The primary duty of the department is to assist the United Kingdom trade. It assists the trade of the dominions, etc., but where a conflict of interests arises the United Kingdom's interest must prevail.
- (5) The bulk of the work of the department is on behalf of average traders who are aware of the advantage of obtaining information and who are not highly organised enough to have a commercial intelligence system of their own. Large firms are more in evidence on the "Special Register" than are small firms.
- (6) Continuous efforts are made to make the existence of the department known to traders. There is, however, the difficulty of insufficient publicity. The "Board of Trade Journal" is, as has already been noted, one of the principal sources of the dissemination of information. Daily bulletins, such as those published in the United States of America, are not considered necessary because the "Weekly Journal" is supplemented, where necessary, by a press announcement regarding any information which would lose its value by a few days' delay. Sir Hubert Llewellyn Smith, it may be noted, in his evidence already referred to, did not appear to be satisfied with the circulation and said that an increase in the circulation (the circulation being 5,000 copies) was desirable.† He pointed out, however, that while he should like to see a much bigger circulation, the value of the publication was really wider than that shown by its circulation because it is largely quoted by trade papers, and this is the chief way in which the journal permeates to the commercial community. It should be pointed out that the most valuable information which is given by the Commercial Intelligence Department to the trade is never published at all. It goes to those interested and is kept away from foreign competitors who are extremely eager to get such information. The Commission suggested that the circulation should be increased by obtaining from every Chamber of Commerce in the country a list of its members. The "Board of Trade Journal" would then be sent to every one of these with a circular letter saying that the information it contains has been gathered at a great cost and at great trouble, that it is considered valuable for the welfare of the whole country, that it is proposed to send free copies for four weeks to enable the prospective subscriber to see the nature of the information that is supplied, and that thereafter it is hoped to have him as a permanent subscriber at a guinea a year.
- (7) His Majesty's Trade Commissioners are wholtime officers, unlike the trade correspondents. They furnish people in the Dominions, desiring to export to the United Kingdom, with any information, subject to the exception that their primary duty must always be to the United Kingdom trade.‡ The trade correspondents are connected with active business and are paid from £50 to £240 a year. In addition to the fees mentioned they are authorised to claim a sum not exceeding £15 per annum for out-of-pocket expenses. The amount spent on Trade correspondents for Canada was before the war £850, Australia £410, New Zealand £210, and South Africa £550-15s.
- (8) It has been found impracticable and undesirable to attempt to make the work of commercial intelligence an Inter-Imperial Institution.
- (9) It is interesting to note the arrangement made before the outbreak of war between the Foreign Office and the Canadian Government as to the utilization of the Consular service for the assistance of Canadian trade. A copy of the Memorandum of the Foreign Office in regard to this will be found in Appendix IV. The Consular officers are authorised to give the same assistance to firms in the Dominions as to the United Kingdom firms except that the Consuls are primarily commissioned to serve the trade of the United Kingdom. They arrange, where practicable, accommodation for Dominion Trade Representatives in their Consulates and assist such representatives as far as possible. The Consuls are furnished with such dominion publications as the dominion Governments think will be of assistance in answering questions as to the resources of the dominions.

* *Vide* also Appendix V.

† The circulation of the Board of Trade Journal in January 1910 was about 5,000 copies; in January 1917 it was over 8,000 copies.

‡ For the importance of the export trade of the United Kingdom as compared with that of India, see Appendix V.

In the preparation of this Memorandum I have been assisted by the evidence of Sir H. Llewellyn Smith, K.C.B., Permanent Secretary to the Board of Trade, before the Dominions Royal Commission. It is perhaps, unnecessary to add that some of the details of the working of the department described above refer mainly to the working of the department at the outbreak of war.

Appendix I.

Official Trade Representation of the United Kingdom in Foreign Countries.*

This consists of His Majesty's Commercial Attachés and His Majesty's Consular Officers (salaried and unsalaried). They are all appointed by, and under the direction of the Foreign Office, and they are authorised to communicate directly with the Commercial Intelligence Branch of the Board of Trade on all commercial matters.

His Majesty's Commercial Attachés, who are officers invested with a diplomatic character and whose functions consist exclusively in assisting British traders and furthering the interests of British Commerce, have been appointed for the following countries or groups of countries;— France, Belgium, and Switzerland; European and Asiatic Turkey and Bulgaria; China; Japan; Germany, Denmark, Holland, Norway and Sweden; Spain and Portugal; Austria-Hungary, Italy, and Greece; and Russia. In the four last-named cases, the Commercial Attachés have their headquarters in London, and divide their time between special investigations abroad and visits to trade centres in the United Kingdom with a view to placing their information at the disposal of British firms and receiving requests for further inquiries. The Commercial Attachés for Turkey and Bulgaria, China, and Japan also return periodically to the United Kingdom for the latter purpose.

The commercial duties of His Majesty's Consular Officers are summarised in the Consular Instructions as being:—“(1) to furnish immediate information with regard to all important changes in local conditions affecting trade or credit; (2) to deal promptly, to the best of their ability, with questions on commercial subjects addressed to them by the Commercial Intelligence Branch of the Board of Trade, or by individual British traders; (3) to prepare and keep up to date, for the use of the Board of Trade, lists of the principal dealers in various classes of goods; (4) to supply special reports from time to time on matters which appear to the Consular Officer to be of commercial interest, or which may be suggested to him by the Foreign Office; (5) to prepare an annual report on the trade of their district.” Amongst the matters as to which the Consular Officers are directed to furnish immediate information are contracts open to tender and changes in local duties and taxes likely to affect British trade, and in local dues and regulations affecting shipping.

Appendix II.

Statement showing the number of Annual and other Reports received from (1) His Majesty's Diplomatic and Consular Officers: and (2) His Majesty's Trade Commissioners and the Trade Correspondents in the Dominions and British Possessions, which have been dealt with by the Commercial Intelligence Branch of the Board of Trade, and published or communicated to traders during the year 1912.

Reports from places in—	“Annual and Miscellaneous” series of Diplomatic and Consular Reports edited at the Foreign Office and Board of Trade and published by the Foreign Office.†	OCCASIONAL (SPECIAL) REPORTS PUBLISHED IN THE “BOARD OF TRADE JOURNAL.”			Occasional (special) Reports utilised for Circulars to firms on the “Spe- cial Register” of the Commercial Intelligence Branch.	Total.
		Notices of Calls for Tender.	Other.	Total.		
(I) Reports from His Majesty's Diplomatic and Consular Officers.						
Europe	78	253	770	1,023	275	1,376
Africa	20	108	85	193	56	269
Asia	62	4	156	160	114	336
America N.	18	8	215	223	46	287
America, Central and West Indies.	10	4	47	51	31	92
America S.	17	14	187	201	101	319
Pacific Islands	4	—	—	—	—	4
Total	209	391	1,160	1,851	623	2,683

* Board of Trade Memorandum (Commercial Department), December, 1913.
† Annual Reports from Vice-Consulates which were published as parts of the reports of the several Superintending Consulates or Consulates-General are not separately enumerated. Consular Reports from the Colonies of European Countries are included under the Continent in which the places to which they relate are situated.

Statement showing the number of Annual and other Reports received from (1) His Majesty's Diplomatic and Consular Officers: and (2) His Majesty's Trade Commissioners and the Trade Correspondents in the Dominions and British Possessions, which have been dealt with by the Commercial Intelligence Branch of the Board of Trade, and published or communicated to traders during the year 1912—contd.

Reports from places in—	“Annual and Miscellaneous” series of Diplomatic and Consular Reports edited at the Foreign Office and Board of Trade and published by the Foreign Office.	OCCASIONAL (SPECIAL) REPORTS PUBLISHED IN THE “BOARD OF TRADE JOURNAL.”			Occasional (special) Reports utilised for Circulars to firms on the “Special Register” of the Commercial Intelligence Branch.	Total.
		Notices of Calls for Tender.	Other.	Total.		
(II) Reports from His Majesty's Trade Commissioners and the Trade Correspondents in the Dominions and British Possessions.						
Europe	—	—	5	5	—	5
Africa	—	43	76	119	103	222
Asia	—	2	13	15	5	20
America N. and Central and British West Indies.	—	38	347	385	257	642
Australia, New Zealand and British Islands in the Pacific.	—	113	139	252	139	391
Total	—	196	580	776	504	1,280
GRAND TOTAL	209*	587	2,040	2,627	1,127	3,963

Appendix III.

Statement showing the number of Written Enquiries and of Personal Enquiries, respectively received at the Commercial Intelligence Branch of the Board of Trade in the years 1912 to 1916; and giving particulars as to the Nature of the Written Enquiries.

Nature of Enquiries.

Written Enquiries relative to—

	1912.	1913.	1914.	1915.	1916.
Statistics	526	546	1,503	668	603
Lists of firms, names of officials, and various other matters connected with foreign trade.	6,320	6,134	16,326	21,383	15,457
Tariffs, Customs Regulations, and Certificates of Origin	1,060	1,070	1,472	2,179	3,093
Tenders and other openings for trade	767	489	1,235	489	306
Official and other publications	426	592	2,277	2,423	1,068
Sources of supply and prices	221	204	513	123	237
Patents, trade marks, and merchandise marks	69	63	83	48	101
Commercial travellers' licenses, etc.	40	35	16	7	4
Railway and freight rates	24	24	33	32	387
Health and climate conditions, costs of living and general conditions in places abroad.	153	113	68	34	24
Company law and other legal matters	32	37	107	151	72
“Board of Trade Journal”	169	257	289	409	538
Miscellaneous subjects	509	465	1,822	7,002	5,526
TOTAL WRITTEN ENQUIRIES	10,316	9,829	25,799	34,948	27,416
Personal Enquiries	6,172	6,839	14,794	15,536	11,602
TOTAL	16,488	16,668	40,593	50,484	39,018

* Excluding Reports for the year 1911, by His Majesty's Trade Commissioners for Australia, South Africa and New Zealand (published separately in 1912).

Appendix IV.

1. The Department of Trade and Commerce of Canada will be furnished with any reasonable number of copies of all trade reports from the Far East and from any other district which they may specify as soon as they are published.
2. Any Canadian firms will be at liberty to apply direct to any of His Majesty's Consuls for information as to possibilities of sale of Canadian products, the methods under which business is conducted, and the best means of getting into touch with markets. They will receive all possible assistance in this matter, subject to the condition laid down in the Report of the Canadian Minister of Trade and Commerce, that the Consuls are primarily commissioned to serve the trade of the United Kingdom. The Canadian Department of Trade and Commerce will be supplied from time to time with lists of His Majesty's Consular Representatives in the Far East and in other districts in which they are interested.
3. The Department of Trade and Commerce will prepare a statement of Canada's commercial and industrial resources and developments, giving a list of principal industries and sources of supply, and indicating the questions upon which Canadian merchants and manufacturers desire information. This document, which will be revised from time to time, will be communicated to His Majesty's Consuls from the Foreign Office with instructions to pay particular attention to the questions referred to. The Commercial Attachés will be instructed to report from time to time regarding them, and such reports will be forwarded from London to the Department of Trade and Commerce without delay.
4. Canadian Trade Commissioners will be at liberty to apply to His Majesty's Consuls for advice and assistance.
5. Before any decision is taken on the question of attaching commercial agents to His Majesty's Consulates in the Far East (China, Japan, and Eastern Siberia), the Canadian Department of Trade and Commerce will send out a special representative for the purpose of studying trade conditions on the spot and deciding on the best means of promoting Canadian trade there. His Majesty's Consuls will be instructed to give him every assistance, including the provision of interpreters and introductions to the principal officials and merchants, native and foreign. In particular he will be able to obtain in the offices of the Commercial Attachés in Yokohama and Peking a great deal of valuable information regarding all forms of commercial activity. His Majesty's Consuls and the Commercial Attachés will be empowered to discuss with him the practicability of attaching Canadian commercial agents to the Consulates, but it is recognised that periodical visits of the kind suggested may be found to meet the requirements of Canada more efficiently and at less cost than the permanent attachment to the Consulates of commercial agents.
6. Should the Canadian Government desire that office room should be afforded in British Consulates for Canadian commercial representatives no objection would be raised in principle.
7. Each case would be considered on its own merits and be a matter of arrangement between Canada and the British Government dependent on the needs and convenience of the Consular office. When such accommodation is granted it is understood that the Consular office assumes no responsibility for the direction or work of the Canadian representative.
8. The members of the Canadian commercial service will be eligible for selection and entrance to the British commercial service on such terms and conditions as are set for other entrants thereto, subject to the regulations of the British Government in the carrying out of its service.

FOREIGN OFFICE;
24th July 1912.

Appendix V.

Value and Percentage of Indian Manufactured Merchandise exported to total exports of Indian Merchandise.

Year.	Value of total exports of Indian merchandise.	Value of exports of Indian manufactured merchandise.	Percentage of Indian manufactured articles exported to total exports of Indian merchandise.
	£	£	Per cent
1911	144,976,902	33,269,984	22·9
1912	159,601,806	37,565,419	23·5
1913	160,742,603	36,791,162	22·9
1914	138,268,990	32,010,718	23·2
1915	118,968,634	38,201,065	32·1
1916	149,759,497	49,688,455	33·2

Value and Percentage of British Manufactured Merchandise exported to total exports
of the Produce and Manufactures of the United Kingdom.

Year.	Value of total exports of the produce and manufactures of the United Kingdom.	Value of exports of articles manufactured in the United Kingdom.	Percentage of the United Kingdom manufactured articles exported to total exports of the produce and manufactures of the United Kingdom.
	£	£	Per cent
1911	454,119,298	362,222,627	79·7
1912	487,223,439	385,028,315	79
1913	525,245,289	411,368,358	78·3
1914	430,721,357	338,633,564	78·6
1915	384,868,448	292,926,785	76·1

NOTE ON EXHIBITIONS.

SUMMARY.

PARAS.

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- 2. " Universal " Exhibitions and " Special " Exhibitions 3
- 3. Official Exhibitions and Officially recognised Exhibitions 4
- 4. Provincial Exhibitions in India 5
- 5. Specialised or Special Exhibitions are of advantage not only to the consumer of goods, but to the manufacturer who requires educating equally with the consumer 6
- 6. Fairs on the Board of Trade Model 7
- 7. Specimen Catalogues as a means of familiarising manufacturers with enemy methods of advertising 8

In October 1912, an International Conference was held in Berlin on the invitation of the German Government for the purpose of limiting by international agreement the number of International Exhibitions and of establishing, as far as possible, a code of regulations with regard to the organisation and management of exhibitions. The Convention drawn up at this Conference was signed by the delegates of 16 countries. The Board of Trade in a memorandum summarised the causes which led to the summoning of the Conference: "International exhibitions had in the past constantly been held in places where the commercial results accruing from participation could not repay exhibitors for the expense of sending a creditable exhibit. The selection of the date and locality of such exhibitions had been influenced not so much by the suitability of the market or the occurrence of an opportunity of assisting the development of trade as by the prospect of attracting visitors, and achieving financial success for the promoters. The organisers of such exhibitions relied upon the rivalry existing between the manufacturers of the chief commercial nations to secure the participation of countries who would not take part if their commercial competitors were not represented. When deciding whether or not to participate in any great international exhibition, the Governments of the principal countries were in much the same position as individual exhibitors; their decision depended not so much upon the benefits which were likely to accrue from participation, as upon the loss which would in all probability be sustained by the trade of their country if they abstained from an exhibition in which its commercial rivals took part."

2. "The reasons for the reluctance on the part of manufacturers to take part in exhibitions were reviewed by a Committee which was appointed in 1906, under the chairmanship of Sir Alfred Bateman, to enquire into the nature and extent of the benefit accruing to this country (i. e., the United Kingdom) from participation in great international exhibitions. The evidence taken by this Committee showed that this reluctance to exhibit was attributable in a large degree to the following causes:—Exhibitions have been held too frequently. Their immense size has rendered it difficult for individual exhibits to attract the notice of prospective buyers, the attention of visitors being to a great extent diverted from the exhibits by the large number of sideshows and other items of entertainment. The large attendance of visitors

thus secured may benefit those industries classed under the heading of applied art which appeal to the general public, but this is by no means the case as regards the staple industries whose products are mainly of interest to commercial men. The cumbrous procedure and elaborate setting of great international exhibitions have, moreover, been found to entail unnecessary trouble and expense. The lengthy period of six months or more for which such exhibitions are kept open greatly increases the cost of maintenance and also involves the locking up for an unnecessarily long time of the capital sums expended in the manufacture of the exhibits. There has further been a general feeling that the value of awards gained at universal exhibitions has deteriorated owing to the frequency with which such exhibitions have been held, and the indiscriminate manner in which awards have been bestowed. Manufacturers of certain classes of goods have also referred to the danger of having their patterns and designs copied by foreign rivals. The Committee pointed out, however, in regard to this last objection that the opportunities for obtaining information as to new designs

are continually increasing and are by no means confined to exhibitions.* These criticisms on exhibitions would apply generally to large exhibitions in this country.

3. The Convention differentiated between (1) Universal exhibitions, and (2) Special exhibitions, *i.e.*, exhibitions the sole object of which is to assist in the development of one or more particular branches of a trade. This latter class of exhibitions is regarded as serving a useful purpose. Sir H. Llewellyn Smith pointed out to the Dominions Royal Commission that the Specialised Exhibition held at Leipsic was patronised keenly by British publishers, as Leipsic is the centre of the world's book trade. To a certain extent this class of exhibitions is free from the difficulties which have made the manufacturers reluctant to take part in universal exhibitions.

4. It may be noted that the experience gained by the Exhibitions Branch of the Board of Trade is that a large number of manufacturers will welcome the opportunity of taking part in officially recognised exhibitions, since this would offer a valuable opportunity of developing trade. An exhibition is 'official' when it is organised, directed, and managed by a Government or its delegates; it is 'officially recognised' when it is organised, directed, and managed by a body which has obtained, for that purpose, the recognition, patronage, or

† The Berlin Convention applies only to International Exhibitions, but the rules are very suitable for special exhibitions.

authorisation of the Government. The Convention † states that "the recognition, patronage, or authorisation of the Government shall not be accorded to an exhibition or to participation in an exhibition, unless it affords substantial guarantees with regard to its administrative and financial organisation, and unless it assures to the Government and their delegates a power of general control over the administration and financial management." The direct responsibility is assumed by the inviting Government, and this is a principle which might be adopted for provincial exhibitions in this country held at a minimum interval of three years, a limit which is laid down for international exhibitions by the Berlin Convention. Such a provincial exhibition would, it is believed, be welcomed by manufacturers—large and small.

5. The exhibitors should be confined to British and Indian exhibitors but should exclude foreign non-British exhibitors. The exhibitions should be in principle unlimited in scope, but in practice should be specialised to suit the conditions of the province or of that part of India in which they are held. It is an undoubted fact that many manufacturers have been reluctant to exhibit, largely owing to the fact that such exhibitions have been promoted in places and at times where the expenses of sending exhibits would not cover the resulting business due to them. Exhibitions are useful as they stimulate the demand for products not hitherto known and they are of assistance in opening up local agencies as well as developing those already in existence. Provincial exhibitions should have as the basis Government responsibility and should generally follow the regulations which were made at the Berlin Convention in 1912.

6. Exhibitions, if properly controlled, are of advantage not only to the consumer of goods, but to the manufacturer who requires educating equally with the consumer.

7. Since the outbreak of war the Board of Trade has instituted fairs or exhibitions to promote special trade, which have been remarkably successful.‡ Such models might possibly with advantage be adopted in this country. It is interesting to note that admission

‡ Appendix, pages 72-73.

to the fair was by invitation of the Board of Trade, and the general principle was to restrict invitations to *bond fide* trade buyers. The object of the fairs was, in short, to give British firms an opportunity of exhibiting goods of their own manufacture and to bring them into touch with both home and oversea buyers. More than 30,000 persons visited the British Industries Fair during the days on which it was open, *i.e.*, from the 10th to 21st May 1915. Over 300 foreign and colonial buyers were amongst the visitors. The business transacted exceeded all expectations. A similar Fair was held in 1916 and it is proposed to make these annual Fairs a permanent feature of the Department of Commercial Intelligence of the Board.

8. Another point connected with these exhibitions, which is worthy of imitation, is the success of the Board of Trade in familiarising manufacturers and exporters, etc., with

German and Austrian methods of advertising. The Board has recently made a collection of about 7,200 specimen catalogues of German and Austrian origin which are of special interest to the trade. "Catalogues, samples, and prices," as Mr. Hooker in his "Handicap of British Trade with special regard to East Africa" points out, "are the working tools of the exporter, and his stock in trade; the invoices are the final varnish or French polish." There are over 1,000 catalogues of machinery, in addition to over 2,000 catalogues of machine tools. There are about 300 toy catalogues, including the productions of the well-known Nuremberg toy manufacturers. There are also about 200 catalogues of hardware, 200 catalogues of fancy goods, 520 of electrical goods, and 70 of glassware, in addition to a considerable number referring to tools, photographic apparatus, musical instruments, household utensils, furniture, stationery, etc. These German and Austrian catalogues are printed, it may be noted, in various languages to suit the importer. Some are printed even in three, four, and six different languages. Arrangements have been made by the Board of Trade whereby catalogues may be lent for a few days to United Kingdom firms. This scheme is well worthy of imitation in this country.

Appendix.

List of Exhibitions and Fairs since the outbreak of war (in the United Kingdom).

1914.

(1) Exhibition of German and Austrian samples at exchange meetings of manufacturers and buyers in London—September 24th to 25th; October 7th to 8th, 22nd to 23rd; November 5th to 6th, 19th to 20th, and December 3rd to 4th. (Board of Trade.)

1st Exchange meeting	.	.	.	Toy trade.
2nd "	"	.	.	Glass, earthenware, and china.
3rd "	"	.	.	Fancy goods.
4th "	"	.	.	Electroplate, cutlery, and clock.
5th "	"	.	.	Household utensils.
6th "	"	.	.	Jewellery and haberdashery.

1915.

(1) The first British Industries Fair held in London, 10th to 21st May, 1915. The object of the Fair was to give the British firms an opportunity of exhibiting goods of their own manufacture and to bring them into touch with both home and oversea buyers. (Board of Trade.)

(2) Exhibition of samples of German and Austrian goods held by the Board of Trade.

(3) Exchange meetings of manufacturers and buyers in London, January 7th to 8th, 28th to 29th; February 11th to 12th; March 3rd to 4th; April 15th to 16th. (Board of Trade.)

7th Exchange meeting (7th—8th January)—Electrical apparatus and appliances.

8th " " (28th—29th January)—Cotton piece-goods and other textiles.

9th " " (11th—12th February)—Paper and stationery.

10th " " (3rd—4th March)—Hardware.

11th " " (15th—16th April)—Hand and edge tools.

(4) Exhibition of German and Austrian Catalogues. (Board of Trade.)

(5) Exhibition of German and Austrian articles typifying successful design, 24th—26th March, London.

(6) War Exhibition in London by the London Chamber of Commerce, June to October.

(7) Exhibition by the Board of Trade of samples of German and Austrian goods from abroad at—

(i) Leicester—27th September—2nd October.

(ii) Nottingham—18th—23rd October.

(iii) Leeds—8th—13th November.

(iv) Glasgow—29th November—4th December.

(8) Toy Fair and Market in London.

1916.

(1) Second British Industries Fair in London held by the Board of Trade, 21st February to 3rd March.

(2) Exhibition of German catalogues in London by the Board of Trade.

(3) Exhibition of samples of German and Austrian goods from abroad by the Board of Trade at—

(a) Sheffield—7th to 13th April.

(b) Liverpool—22nd to 27th May.

(c) Birmingham—23rd to 29th June.

(d) Manchester—10th to 15th July.

(e) Bristol—1st to 5th August.

(f) Dublin—21st to 26th August.

- (4) London Fair and Market—14th to 24th March.
- (5) Clothing and Drapery Exhibition in London—May 1st to 12th.
- (6) Royal Agricultural Show in London—June 27th to July 1st.
- (7) Jewellers' and Silversmiths' Exhibition in London—July 5th to 13th.
- (8) Confectioners' and Bakers' Exhibition in London—September 2nd to 9th.
- (9) Grocers' Exhibition in London—September 18th to 22nd.
- (10) Shoe and Leather Fair in London—October 2nd to 7th.
- (11) Dairy Show in London—October 17th to 20th.
- (12) Brewers' Exhibition in London—October 28th to November 3rd.
- (13) Smithfield Club Cattle Show in London—December 4th to 8th.

NOTE ON CAPITAL INVESTMENTS IN INDIA.

Endeavours have been made from time to time to estimate the capital invested each year for trading, industrial, and other purposes, but it has not been possible to record the *total* public issues of fresh capital, Indian and foreign, within the country. The tracing of new investments is fraught with difficulties, and no regular statement of total capital invested has been prepared for publication. The main difficulties are:—

- (a) New issues may in part be made either for the redemption of debt or for the funding of loans already made,
- (b) Some companies conduct operations also in countries other than India, and capital raised for their general purposes cannot be correctly allocated between the countries in which it is actually used, and
- (c) Much private capital including that of unincorporated bankers, money-lenders, merchants, etc., is invested, of which no record is available.

2. This department has, however, published annually the capital of the banks and joint-stock companies whether incorporated in India or out of India but working in India, under the following classes:—

- (1) Presidency Banks.
- (2) Exchange Banks.
- (3) Indian Joint-Stock Banks and Loan Companies.
- (4) Insurance Companies.
- (5) Trading Companies—
 - (i) Navigation.
 - (ii) Railways and Tramways.
 - (iii) Co-operative Associations.
 - (iv) Shipping, landing, and warehousing.
 - (v) Printing, publishing, and stationery.
 - (vi) Others.
- (6) Mills and Presses—
 - (i) Cotton Mills.
 - (ii) Jute Mills.
 - (iii) Mills for wool, silk, hemp, etc.
 - (iv) Cotton and jute screws and presses.
 - (v) Paper Mills.
 - (vi) Rice Mills.
 - (vii) Flour Mills.
 - (viii) Saw and Timber Mills.
 - (ix) Others.
- (7) Tea and other Planting Companies—
 - (i) Tea.
 - (ii) Coffee and Cinchona.
 - (iii) Others.
- (8) Mining and Quarrying—
 - (i) Coal.
 - (ii) Gold.
 - (iii) Others.
- (9) Land and Building.
- (10) Breweries.
- (11) Ice Manufacture.
- (12) Sugar Manufacture.
- (13) Others.

3. The Blue Books styled "Statistical Tables relating to Banks in India" and "Statistics relating to Joint-Stock Companies in British India and Mysore" publish the detailed figures of the abovementioned Banks and joint-stock companies. They are also given in

Parts I to IV of the 6th Issue.

* Appendix II.

abstract form in the Statistics of British India, Volume I—Commercial Statistics and Volume II—Financial Statistics.

A half-yearly statement of increase or decrease in the paid-up capital of companies incorporated in India is also published by this department, *vide* Appendix I.

A statement of joint-stock companies newly registered in India in each month is compiled in this Department and published.

It may also be mentioned here that the capital employed on the Indian railways, irrigation, and co-operative societies of India is also compiled and published in the Statistics of British India, Volumes I and II.

4. A statement* has been prepared for the Commission to show the total capital, including debentures, invested in India during the years 1905-06 and 1910-11 to 1914-15, so far as ascertainable from available statistics. The statement is, it may be noted, defective and incomplete inasmuch as it excludes, for example, the capital of exchange banks (£22,815,000), because it has not been possible to state correctly how much of it is employed in Indian business, and also the capital of certain foreign companies which do only part of their business in India for which accurate information is not available. The statement is divided into two parts—Part I deals with the paid-up share capital, including debentures, of companies registered under the Indian Companies Act, and those with a sterling capital carrying on business more or less exclusively in India. The share capital of railways is excluded as the total capital outlay on railways is shown in Part II, which also includes the capital outlay on irrigation and telegraphs, the loans of port trusts and municipalities, and the paid-up capital of co-operative societies.

The total capital shown in Part I amounted to £94,260,000, which is distributed as follows :—

	Capital. £(1,000)	Debentures. £(1,000)
Presidency Banks	2,500	...
Indian Joint-Stock Companies	46,665	7,259
Foreign ditto	34,155	3,680
Total	83,320	10,939

Taking this total as 100, the shares in 1914-15 of the principal lines of business are as follows :—

	Per cent.
Tea planting	24.0
Cotton Mills	14.8
Jute Mills	11.1
Coal mining	5.2
Indian Joint Stock Banks	4.1
Gold mining	2.7
Presidency Banks	2.6
Tramways	2.5
Cotton and jute presses	2.1

The total amount of capital outlay, debts, loans, etc, shown in Part II was nearly £434,000,000, of which Railways represent £346 millions, irrigation £36½ millions, telegraphs £8½ millions, municipal loans £16½ millions, and port trust loans £20 millions. The total capital investments shown both in Parts I and II amounted to ₹792 crores (£528,000,000) in 1914-15 as against ₹523 crores (£349,000,000) in 1905-06, showing an increase of ₹269 crores (£179,000,000) or 51 per cent. The most noticeable increases in 1914-15 as compared with ten years ago (1905-06) are as follows :—

	ACTUAL INCREASE.		Per cent of total increase.
	£ millions.	per cent.	
Railways	107	45	59.8
Irrigation	11	43	6.1
Port Trusts	11.2	124	6.3
Cotton and jute mills and presses	8.1	44	4.5
Tea planting	6.9	44	3.8
Municipal loans	3.7	28	2.1
Coal mining	3.3	206	1.8

It is, perhaps, unnecessary to repeat the caveat in the first paragraph of this memorandum that the table in Appendix II is not complete. The total of £528 millions, it may be noted incidentally, is considerably lower than the gross annual value of the agricultural produce of British India.

5. An index to the capital investments referred to in the preceding paragraphs is given in Appendix III.

Appendix I.

Joint Stock Companies.

Statement showing increase or decrease in the Capital of Companies, incorporated in India and registered under the Indian Companies Act (VII of 1913), during the half-year ending the 31st December, 1915.

PROVINCES.	TOTAL PAID-UP CAPITAL AT THE CLOSE OF THE PREVIOUS HALF-YEAR.		NEW COMPANIES REGISTERED DURING THE HALF-YEAR.		COMPANIES WOUND UP DURING THE HALF-YEAR.		
	Share Capital.	Debenture Capital.	Number.	Authorised Share Capital.	Number.	Paid-up Share Capital.	Paid-up Debenture Capital.
1	2	3	4	5	6	7	8
	Rs.	Rs.		Rs.		Rs.	Rs.
Madras	(a) 5,65,89,948	(a) 37,66,605	6	18,59,990	20	4,79,800	...
Bombay	30,47,22,663	4,21,07,281	10	40,20,000	23	60,65,074	10,16,372
Bengal	31,16,47,768	6,05,44,383	36	1,66,41,009	9	6,77,075	86,000
United Provinces	3,87,43,597	17,58,160	1	8,00,000	8	1,67,427	...
Punjab	1,38,10,433	6,46,300	2	1,00,000	9	5,65,977	...
Delhi	29,82,511	...	1	50,000	...	...	...
North-West Frontier Province	2,19,670	...	...	...	...	...	...
Burma	5,88,52,229	...	1	75,00,000	11	48,20,144	...
Central Provinces and Berar	(a) 45,36,556	26,343	...	...	...	...	...
Bihar and Orissa	13,17,159	...	...	...	4	36,672	...
Assam	10,72,322	42,213	...	...	5	20,239	4,731
Bangalore (Civil and Mily. Stn.)	7,62,165	...	...	...	...	...	...
Coorg	24,000	...	...	...	...	...	...
Ajmer-Merwara	18,26,320	10,600	...	...	...	...	...
TOTAL BRITISH INDIA	79,71,07,346	10,89,01,885	57	3,09,70,990	89	1,28,32,408	10,57,103
Mysore State (b)	42,28,991	...	1	20,000	2	85,450	...
GRAND TOTAL	80,13,36,337	10,89,01,885	58	3,09,90,990	91	1,29,17,858	10,57,103

PROVINCES.	INCREASE OR DECREASE IN THE PAID-UP CAPITAL OF COMPANIES EXISTING AT THE END OF THE HALF-YEAR AS COMPARED WITH THE PREVIOUS HALF-YEAR.				TOTAL NET INCREASE (+) OR DECREASE (—) IN PAID-UP CAPITAL DURING THE HALF-YEAR.		TOTAL PAID-UP CAPITAL AT THE END OF THE HALF-YEAR.	
	Increase.		Decrease.		Share Capital.	Debenture Capital.	Share Capital.	Debenture Capital.
	Share Capital.	Debenture Capital.	Share Capital.	Debenture Capital.				
1	9	10	11	12	13	14	15	16
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Madras	28,55,295	79,186	12,73,668	15,750	+ 11,01,827	+ 63,446	5,78,91,775	88,30,051
Bombay	65,13,591	48,73,000	19,55,855	2,15,000	— 15,07,338	+ 36,41,628	30,32,15,325	4,57,48,900
Bengal	59,33,813	500	49,234	24,05,926	+ 52,07,504	— 24,41,426	31,68,55,272	5,81,02,957
United Provinces	74,38,017	...	...	1,33,300	+ 72,70,590	— 1,33,300	4,60,14,187	16,24,860
Punjab	3,42,579	...	...	30,700	— 2,23,398	— 30,700	1,35,87,040	6,15,600
Delhi	10,031	...	...	...	+ 10,031	...	29,92,542	...
North-West Frontier Province	649	...	...	...	+ 649	...	2,20,319	...
Burma	6,22,654	...	2,00,120	...	— 43,97,610	...	5,44,54,619	...
Central Provinces and Berar	4,070	...	...	...	+ 4,070	...	45,40,626	26,343
Bihar and Orissa	42,246	...	...	...	+ 5,574	...	13,22,733	...
Assam	40,070	15,246	3,619	16,662	+ 16,212	— 6,147	10,88,534	36,066
Bangalore (Civil and Mily. Stn.)	5,938	...	...	...	+ 5,938	...	7,68,103	...
Coorg	...	...	...	...	...	...	24,000	...
Ajmer-Merwara	442	3,500	2,254	...	— 1,812	+ 3,500	18,24,508	14,100
TOTAL BRITISH INDIA	2,38,09,395	49,71,442	34,84,750	28,17,338	+ 74,92,237	+ 10,97,001	80,45,99,583	10,99,98,886
Mysore State (b)	5,64,677	...	91,985	...	+ 3,87,242	...	46,16,233	...
GRAND TOTAL	2,43,74,072	49,71,442	35,76,735	28,17,338	+ 78,79,479	+ 10,97,001	80,92,15,816	10,99,98,886

NOTE.—Columns 9 and 10 include the paid-up capital of new Companies registered during the half-year.
(a) Revised. (b) Registered under the Mysore Regulation, III of 1895.

This statement is compiled from returns furnished half-yearly by Registrars of Joint Stock Companies. From a comparison of columns 2 and 3 with columns 15 and 16, it will be seen that in British India there was a net increase of Rs. 74,92,000 in paid-up share capital and of Rs. 10,97,000 in debenture capital at the end of the half-year ending December 1915, as compared with the preceding half-year ending June 1915. Of this increase the United Provinces accounted for Rs. 72,71,000 and Bengal for Rs. 52,07,000 in paid-up capital, and Bombay accounted for Rs. 36,42,000 in debenture capital. In the Native State of Mysore the share capital increased by Rs. 3,87,000.

Appendix II.

Statement showing capital invested in India, so far as ascertainable from available statistics.

	1905-06.	1910-11.	1911-12.	1912-13.	1913-14.	1914-15.	Percent- age to total share capital.	Percent- age to Grand Total.
	£(1,000)	£(1,000)	£(1,000)	£(1,000)	£(1,000)	£(1,000)		
I.—Paid up share capital (including debentures) of companies, registered under the Indian Companies Act, and of foreign companies, incorporated outside India (excluding Insurance, Navigation, and general trading companies, which only partly do business in India)—								
Presidency Banks(a)	2,400	2,400	2,400	2,500	2,500	2,500	2.6	.5
Indian Joint Stock Banks and Loan Companies	1,913	3,650	3,621	3,895	3,792	3,940	4.1	.8
Insurance	67	195	232	274	307	339	.4	...
Tramways	1,406	4,476	5,729	5,763	5,676	2,367	2.5	.4
Navigation	205	938	972	790	824	859	.9	.2
Cotton Mills	10,158	12,255	12,385	12,286	12,888	13,907	14.8	2.6
Jute Mills	7,015	9,396	9,479	9,827	10,330	10,510	11.1	2.0
Cotton and Jute Screws and Presses	1,159	1,739	1,843	1,885	2,030	1,942	2.1	.4
Paper Mills	323	408	409	402	435	433	.5	.1
Rice Mills	1,144	2,877	2,696	2,698	2,833	865	.9	.1
Saw and Timber Mills	390	132	91	78	371	226	.2	...
Tea Planting Companies	15,682	18,106	18,819	18,951	18,835	22,589	24	4.3
Coal Mining	1,604	4,911	4,920	4,889	5,096	4,914	5.2	1.0
Gold Mining	2,573	3,216	2,996	3,033	2,773	2,549	2.7	.5
All other Companies (including General Trading Companies.)	9,825	18,303	23,958	26,307	26,766	26,319	28	5.0
TOTAL	55,864	83,002	90,550	93,578	95,456	94,259	100	17.9
II.—Capital outlay, debts, loans, etc.—								
Railways (capital outlay) (b)	239,012	292,698	300,045	310,100	330,058	343,148	...	65.6
Irrigation (capital outlay) (b)	25,663	31,526	33,132	34,330	35,585	36,679	...	7.0
Telegraphs ditto (b)	6,204	7,412	7,640	7,865	8,113	8,350	...	1.5
Port Trusts (capital debt) (c)	9,011	15,978	16,615	17,616	18,736	20,196	...	3.8
Municipal loans (d)	12,993	15,165	15,271	15,597	16,108	16,657	...	3.1
Co-operative Societies (paid-up capital)	31	1,351	2,269	3,562	5,145	5,977	...	1.1
TOTAL	292,920	364,130	374,972	389,070	413,745	434,007	...	82.1
GRAND TOTAL £(1,000)	348,784	447,132	465,522	482,648	509,201	528,266	...	100
==R(lakhs)	5,23,18	6,70,70	6,98,28	7,23,97	7,63,80	7,92,40	..	...

NOTE.—This statement is necessarily incomplete. It excludes, among other things, (1) the capital of exchange banks and Companies (e.g., Insurance, Navigation, General Trading) registered elsewhere than in India. This is approximately £240,000,000 sterling; (2) the capital invested in numerous businesses which do not come within the provisions of the Indian Companies Act.

(a) Incorporated under the Presidency Banks Act, XI of 1876.

(b) The total capital outlay on Railways, Telegraphs, and Irrigation at the end of each year has been taken into account.

(c) The total capital debt of the Port Trusts at the end of each year has been included.

(d) The municipal loans represent the debentures issued by the Calcutta, Bombay, Madras, and Rangoon Municipalities, together with the Imperial and Provincial advances and loans to the City and other Municipalities.

Appendix III.

Index to capital investments.

Items.	Reference.
Banks, Exchange	1. Statistical Tables relating to Banks in India, 2nd issue, pages 3-5, 8-10, 11-14.
„ Indian Joint-Stock	2. Statistics of British India, Part II, 6th issue, pages 73-78.
„ Presidency	
Breweries	1. Statistical Abstract for British India, 7th issue, Volume I, pages iii, 103. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 13 and 27.
Building and Land	(See Land and Building.)
Capital paid-up, half-yearly increase or decrease.	Published in the <i>Indian Trade Journal</i> and <i>Gazette of India</i> .
Cinchona and Coffee	(See Coffee and Cinchona.)
Coal	1. Statistical Abstract for British India, 7th issue, Volume I, pages 103 and 117. 2. Report on the production and consumption of coal in India, 9th issue, pages 27-29. 3. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 13 and 27.
Coffee and Cinchona	1. Statistical Abstract for British India, 7th issue, Volume I, pages 103 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 13 and 27.
Cotton and Jute Screws and Presses	1. Statistical Abstract for British India, 7th issue, Volume I, pages 102 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 12 and 27.
Cotton Mills	1. Statistical Abstract for British India, 7th issue, Volume I, pages 52-57, 102 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 12 and 27.
Co-operative Associations	Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 12 and 27.
Co-operative Societies	Statistics of British India, Part II, 6th issue, pages 79-85.
Exchange Banks	(See Banks.)
Flour Mills	1. Statistical Abstract of British India, 7th issue, Volume I, pages 102 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 12 and 27.
Gold	1. Statistical Abstract for British India, 7th issue, Volume I, pages 103 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 13 and 27.

Index to capital investments—contd.

Items.	Reference.
Hemp Mills	(See Mills for wool, silk, hemp, etc.)
Ice Manufacture	1. Statistical Abstract for British India, 7th issue, Volume I, pages 103 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 13 and 27.
Indian Joint-Stock Banks	(See Banks.)
Insurance Companies	1. Statistical Abstract for British India, 7th issue, Volume I, pages 102 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 12 and 27.
Irrigation	Statistical Abstract for British India, 7th issue, Volume I, pages 203, 206—211.
Joint-Stock Banks	(See Banks.)
Joint-Stock Companies : newly registered.	A statement published monthly in the <i>Indian Trade Journal</i> .
Jute Mills	1. Statistical Abstract for British India, 7th issue Volume I, pages 73—75, 102 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 12 and 27.
Jute Screws and Presses	(See Cotton and jute screws and presses.)
Land and Building	1. Statistical Abstract for British India, 7th issue, Volume I, pages 103 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 13 and 27.
Landing, shipping, and warehousing	(See Shipping, etc.)
Mills and Presses	1. Statistical Abstract for British India, 7th issue, Volume I, pages 102 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 12 and 27.
Mills for wool, silk, hemp, etc. . . .	Ditto ditto.
Mining and Quarrying	1. Statistical Abstract for British India, 7th issue, Volume I, pages 103 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, page 13 and 27.
Municipalities	Statistical Abstract for British India, 7th issue, Volume IV.
Navigation	(See Trading Companies.)
Paper Mills	1. Statistical Abstract for British India, 7th issue, Volume I, pages 76—77, 102 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 12 and 27.
Planting Companies	(See Tea and other Planting Companies.)

Index to capital investments—concl.

Items.	Reference.
Port Trusts	Statistical Abstract for British India, 7th issue; Volume IV.
Presidency Banks	(See Banks.)
Presses	(See Mills and Presses.)
Printing, publishing, and stationery .	1. Statistical Abstract for British India, 7th issue, Volume I, pages 102 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 12 and 27.
Quarrying	(See Mining and Quarrying.)
Railways	Statistical Abstract for British India, 7th issue, Volume I, page 198.
Rice Mills	1. Statistical Abstract for British India, 7th issue, Volume I, pages 102 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 12 and 27.
Saw and Timber Mills	Ditto ditto.
Silk Mills	Ditto ditto.
Shipping, landing, and warehousing .	Ditto ditto.
Stationery, printing, and publishing .	(See Printing, publishing, etc.)
Sugar	1. Statistical Abstract for British India, 7th issue, Volume I, pages 103 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 13 and 27.
Tea and other Planting Companies .	Ditto ditto.
Telegraphs	Statistical Abstract for British India, 7th issue, Volume I, page 191.
Timber Mills	(See Saw and Timber Mills.)
Trading Companies	1. Statistical Abstract for British India, 7th issue, Volume I, pages 102 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 12 and 27.
Tramways	(See Trading Companies.)
Warehousing	(See Shipping, Landing, etc.)
Woollen Mills	1. Statistical Abstract for British India, Volume I, pages 78—79, 102 and 117. 2. Statistics relating to Joint-Stock Companies in British India and Mysore, 1914-15, pages 12 and 27.

ORAL EVIDENCE, 16TH JANUARY 1917.

Mr. A. Chatterton.—*Q.* I understand that most of the statistics that are compiled in your office are supplied to you mainly by the various Departments of Government and what I want to know is whether you have any organization at all in the way of checking the methods by which these statistics are prepared locally?—*A.* The methods by which the statistics are

prepared are checked from time to time. The check is often an indirect one. The returns when received in the sections (of which there are ten in the office) are scrutinised carefully and discrepancies pointed out to local authorities. This often results in a change of method. The check on the returns has been greatly increased since the department was recreated in 1914. For example, as regards prices, two days ago I got a return of wheat prices from the United Provinces and I was not quite satisfied with the wholesale price of wheat in Benares. I immediately telegraphed to the Director of Agriculture and he made enquiries and reported to me the correct figure. Similarly I had another case relating to wool. I was quite sure that the prices returned by the local agency were incorrect and I consulted Mr. McWatters, who is in charge of the wool scheme, and he said that the prices were not those which he was paying. I then reported the matter to the Local Government regarding the system of collection which was bad in that locality. Steps have now been taken to get the Sub-divisional Officer to check these figures. In August, 1915, while examining the method as to how the quarterly trade valuation returns for certain marts in Dacca had been prepared, I found that the return for a certain quarter was prepared weeks after the end of the quarter to which the prices related and was only a return for the day on which the prices were taken and not the *average* prices prevailing during the quarter. Also the prices were collected by a peon of the local Sub-Deputy Magistrate. For checking the method of preparation of rail-borne trade statistics we have a Statistical Auditor who goes round to the different railway audit offices, and in each office checks a complete set of weekly or fortnightly returns taken at random.

Q. Take cotton, for example. Do you check the estimated outturn of cotton against the subsequent movements of cotton in that area by the railway returns?—A. No. Attempts have been made from time to time in the Department of Statistics to check the estimates, province by province, by statistics of internal movements of cotton, but they have not been quite successful, owing mainly to the unregistered movements of cotton by road. Provincial authorities, who are acquainted with local conditions, are, however, to carry out such a check in accordance with orders of Government on the subject. This department makes a comparison of the total estimates for India with exports and consumption for India as a whole every year in the cotton forecasts and in the "Area and Yield of Principal Crops."

Q. With regard to statistics of prices, for instance, in the rail-borne traffic returns, I found in some cases that exports of silk from Mysore State, which is one of your sub-divisions, are valued at totally different rates when it is exported to Bombay as compared with the rates to Madras. Why is that?—A. The reason for this is that under existing orders the trade of a British Province with the Native States is valued according to the prices prevailing in that British Province. The whole question of improving the inland trade returns is now under the consideration of Government.

Q. Do you get your information from the Collectors of Bombay and Madras, or how is it obtained?—A. Which information?

Q. Take, for instance, the value of silk. Who would put down the valuation in the returns?—A. The provincial authorities.

Q. Have you any idea of how it is arrived at?—A. It is arrived at by multiplying the quantity by the value rate fixed by the provincial authorities. Each province prepares a list of value rates based on local prices, but I understand it is primarily the clerks who go out to the bazaar and get information. The maritime provinces, however, obtain their value rates for imported articles from the Custom Houses. The value rates for Bengal are compared, as far as practicable, with the prices quoted in the local Chamber's Price Currents. The inland trade returns of Bengal as also other Bengal statistical returns, it may be noted, are compiled in the Department of Statistics. The statistical work of the Bengal Government was transferred to the Department of Statistics during the administration of Sir John Woodburn in 1901.

Q. Have you any authority or any establishment by which you can deal with these figures when they have gone wrong?—A. Yes. These figures are compared with those of the previous quarter and any large variation in price is pointed out to the authorities concerned for verification. This has been very systematically done since April, 1914.

Q. But are these things properly investigated by the local authorities?—A. I think they do their best, and since we have given attention to this, local authorities are more vigilant now than they were. For example, Local Governments are now reporting and explaining variations of importance to us without our asking. This is eminently satisfactory.

Q. The sea-borne trade returns are very reliable and accurate, but the inland trade returns which are furnished by the railways are frequently inaccurate?—A. I agree with you that they are not altogether accurate. The quantities are taken from the invoices in the railway audit offices. You remember a case from Mysore recently. It was pointed out to us that our figures for quantities were incorrect. It was a case of coal. The Mysore authorities overlooked one vital point. They took as total imports of coal into Mysore only the imports from Bombay and Madras but left out of consideration coal which came from the Nizam's Territory, Bengal, and Bihar and Orissa straight through Madras to Mysore, and that made a great difference in the figures. Our figures, therefore, were correct. Quantities are taken from invoices and therefore are more accurate than the values assigned to the quantities. There is no checking of the quantity figures because it would require a much larger staff in all railway audit offices and errors occasionally find their way in these figures. For example (I quote a curious, but I am glad to say, very exceptional case), in the returns furnished by the Great Indian

Peninsula Railway it was shown that 7,115 maunds of raw Indian silk were imported into Bombay port from Calcutta. On enquiry it transpired that the figures related to Indian tea.

Q. As the figures are published it is not possible for any individual to discover how to get at the final returns. What I should like to know is, would it not be practicable to issue statistics of internal trade movements in a slightly simpler form so that people who have no technical knowledge of the methods of preparing these statistics can obtain accurately the information they want?—A. I do not think the returns are difficult to understand. The whole question, however, of simplifying the rail-borne trade statistics and of improving the "block system" is under the consideration of Government, and they have referred the matter to the Railway Board and that means reference to the Home Directors, and I cannot say how long it will be before a decision is come to.

Q. Have you ever issued hand books describing what statistics you issue?—A. To each publication a list is appended showing the various Blue Books, White Papers, etc., issued by the department, and this is also published in the Government Gazettes and kept up to date. This serves as a guide. We are considering the publication of a hand book. We also have published special hand books as to the compilation of the forecasts, as to how to compile the inland trade returns, foreign sea-borne and land trade returns, etc., with the previous Government rulings on the subject.

Q. One difficulty that we have met with is that it is not easy to find out whether there is a change of method in recording these statistics. One example which occurs to me at the moment is one in which the Madras Government made a serious change by suddenly including all zamindari lands in their returns which were not previously included, and the consequence was that when we took up the statistics at an interval of five years we found an enormous increase, but not a real increase, which was due to the sudden change in the method of returning the statistics?—A. This is unavoidable when improvements are effected in statistical returns and incomplete returns are made complete, but whenever such important changes are made in the statistics the facts are clearly explained in the footnote to the tables in order to avoid any misapprehension on the part of the reader.

Q. Could you not issue a note as regards each statistical return stating during the last ten years or whatever interval is convenient for the purpose, what changes have been made either by the Department of Statistics or by the Local Governments who have furnished the statistics, so that we may not fall into gross errors on account of these changes having been made?—A. I will take a note of it. It will be rather a big piece of work as regards many of the returns. In the sea-borne trade returns, for example, every year in March we review all the requests we have had for additional information during the year and sub-divide our heads or specify new articles accordingly and every year we are making considerable changes there to meet the requirements of trade. For example, if a man comes and wants us to show talking machines and records, or stout and porter, or sulphate of ammonia, etc., separately, we look into the question and if he gives us good reasons I consult the Director General of Commercial Intelligence and the Collectors of Customs and then I write to the Collectors of Customs as to the classification to be adopted. It is, as I say, a big piece of work, but I do not see why we should not consider this.

Q. You think that a reduction can be made in the number of articles classified?—A. As regards the foreign sea-borne trade the articles are not too numerous. In fact we have to add to them as I have just mentioned. But with regard to the inland trade returns, when we met at the last Railway Conference, the general opinion was that it would be better to make a list of, say, about 20 articles which would cover 80 or 90 per cent of railway's trade, and the result of that would be that we would get out returns more quickly and they would be of considerable utility to the railways concerned. Until we hear from the Railways and the Railway Board, nothing can be done in the matter.

Q. For purposes of administration these statistics published in that form in comparatively general classifications are probably all that is wanted, but when we come to deal with the statistics for purposes of trade and for making enquiries with regard to a new industrial development, they are of too general a character to give the information which is usually required. In Mysore we have an enormously large classification in the railway statistics. Would it not be practicable to do something of that kind for the rest of India?—A. I do not think so. I do not think it would be wise. Would it not be better when you made a special industrial enquiry to get out special figures from the audit offices?

Q. Is it practicable for us to write to your office and ask for special information of this kind to be got out for making a specific enquiry?—A. Yes.

Q. Are you in a position to supply such information?—A. We are in a position to supply such information, i.e., information not given in the returns for the whole of India. What we would do is that we would write to the various audit offices or the Director of Agriculture, for example, of the Central Provinces, or local authorities, and see if we could get information for you from the invoices.

Q. But supposing I wanted to know the number of clocks imported into Bombay for the past five years, that is not returned separately in your classification?—A. In the sea-borne trade returns there is a head "Clocks and Timepieces" and figures for this head have been separately recorded since April, 1912. So I would be able to take the number of clocks and timepieces imported by sea into Bombay for the past four years. But if you wanted to know the inland distribution of those imports I should not ordinarily be able to take figures from the railway audit offices for more than a year or two years at most.

Q. The invoices in railway audit offices are destroyed?—A. They are destroyed generally after two years.

Q. Another difficulty that we experienced in dealing with these statistics is that a large proportion of the home trade is classified under 'Miscellaneous'?—A. At present that is the case. But I looked into this about a year ago, and found that the list of articles was an exceedingly large one (containing 123 articles) and that most of those articles in themselves were comparatively unimportant. They were not worth recording separately as they would unnecessarily increase the work in railway audit offices.

Q. They are comparatively unimportant from the statistical point of view, but when we are dealing with investigations many of them become of extreme importance?—A. We could in future write to the Director of Industries similar to what we do in the case of sea-borne trade returns to Collectors of Customs and chambers of commerce asking if there are any articles in inland trade which the Director would like to be separately shown, but then the difficulty would be that we should not always be able to get figures for such articles for all India.

Q. In regard to Inland Trade Returns you have a system of returning not the gross weights but gross weights *minus* certain deductions of an arbitrary character?—A. Prior to 1880-81 the weights shown in the returns were gross weights, but these were considered by Government as inaccurate and a table was drawn up after elaborate investigation, in which the proportion borne by weight of packing to total weight in the case of each commodity was shown in the form of a percentage. In 1883 Mr. (afterwards Sir) Bamfylde Fuller wrote a note on railway traffic registration under instructions from Mr. (afterwards Sir) Edward Buck, Secretary to the Government of India, Department of Revenue and Agriculture. In that note Sir Bamfylde Fuller said that inaccuracy resulting from the entry of gross instead of net weights was in great measure, if not wholly, obviated by the adoption of a system under which deductions were made in the audit office from the invoice weights in accordance with a table drawn up after careful investigation, in which the proportion ordinarily borne to gross weight by weight of packing was shown in the case of each article. The deduction rates are not arbitrary.

Q. Would it not be better to return gross weights on the railway invoices and allow those who have to deal with statistics afterwards to make their own deductions?—A. There seems to be no great objection, but the weights of packings in the case of a fairly large number of articles vary from 10 to 70 per cent of the total gross weights and those who use the returns will have no idea of the allowances to be made on account of packing; for example, gross weight of cotton piece-goods packed in boxes exported from Calcutta during 1915-16 amounted to 268,612 maunds, of which 48,350 maunds (or 18 per cent) represented the weight of packing and the net weight shown in the returns was 220,262 maunds. Similarly gross weight of imports of tea into Calcutta in that year was 3,095,336 maunds, while the net weight was 2,367,932 maunds, the difference 727,404 maunds (or 23·5 per cent) representing the weight of packing. It may be added that the net weight is always shown in the foreign sea-borne trade returns.

Q. As regards the values of railway traffic, would it be possible to get the values put on the invoices? Would it be possible for the railway companies to insist upon a declaration of value on the way bills?—A. I do not think so, and even if they did insist, this would not result in accurate returns. Nothing short of legal enactments will help us in the matter.

Q. Are there not returns of value on the way bills?—A. No. I should have thought that it would be an extremely difficult thing to insist that every person who sends a parcel or anything by railway should declare the correct value. How are you going to check these values? The question of having values declared by consigners of goods was considered by the Government of India in 1885 and 1898 and they decided that values based on declarations which there were no means of checking would be even more fallacious than those obtained under the present system. The question was also considered by the Statistical Committee in 1905 who were not in favour of the proposal. They said that, apart from the fact that Government appeared to have no legal power to require value declarations from consigners, they were more than doubtful whether the values so recorded, over which it would be impossible to exercise any appreciable check, would approximate more closely to the truth than the values obtained under the present system.

Q. Do these railway returns include parcel traffic or is it entirely omitted?—A. Parcel traffic is carried, of course, by passenger, and not by goods trains. The returns include parcel traffic of treasure only. We obtain for the Government of Bengal special returns of fish traffic which is compiled from parcel way bills.

Dr. E. Hopkinson.—Q. Are you in a position to judge whether the statistics which are prepared in your department are largely used by the commercial community?—A. The only way we can judge is by looking at the distribution lists and the number of enquiries we get from time to time from traders. Please see Appendices V and VII to my note on the collection and distribution of statistics. Experience has shown that the commercial public do not know all that is published, and I have been frequently advised by commercial men to ask Chambers of Commerce for lists of firms in special trades and to draw their attention to the particular trade statistics, returns, reports, etc., which are of use to them. In this connection please refer to my memoranda on statistics, paragraph 83, and on commercial intelligence, paragraphs 7 and 9. We would also be the better of a Publicity Section, and I mean to take this up

after the war, when other schemes connected with the usefulness of the department to traders will be discussed.

Q. You find that you do get a large number of supplementary enquiries?—A. Yes.

Q. Do you get much criticism of the form in which the statistics are presented?—A. We get such criticism sometimes from the commercial community and from trade papers or newspapers. For example, the *Economist* recently pointed out that the estimates of outturn published in our Cotton Forecasts were generally understated. Another critic recently pointed out that our trade values for Rangoon about steel pipes were in his opinion too high.

Q. Are you generally able to give the supplementary information which is asked?—A. Very often in the case of Sea-borne trade returns. It means sometimes going through the bills of entry and shipping bills in the Custom Houses and the Collectors of Customs are very helpful in the matter.

Q. How far has your Department been able to give such information without reference to higher authority?—A. Since I took over charge 3 years ago, the Hon'ble Member in charge, has given us a very free hand, and we have had every possible assistance. It is only in very special cases that extra staff would be involved and in such cases I refer to the Commerce and Industry Department by which we are officially controlled, and they usually sanction it if they think it necessary.

Q. And you have made it a point to study the needs of the commercial community and meet them as far as you are able?—A. Yes, and I am almost in constant touch, when I go on tour, with members of Chambers of Commerce, and in Calcutta I meet daily men who are well-posted in their particular lines of business. I have always got the greatest assistance from commercial men who have really been sometimes, as it were, a kind of advisory board. When too I was last at Karachi, they pointed out that the all-India cotton forecast was not quite accurate for that part of India, and then we sat down and looked into the matter and found that one firm exported a great deal of cotton, and as compared with the total production for a series of years it was probable we had underestimated the outturn in those cases. In this way and in similar other ways one gets into touch with the local authorities.

Q. It is part of your duty to collect statistics of joint stock companies?—A. Yes.

Q. Do you find any difficulty arising in the course of your investigation owing to the fact that there are not in India a body of Chartered Accountants just as we have got at home on whose information you can rely?—A. No difficulty has been experienced in the Department of Statistics. Under the new Companies Act, the Registrars of Joint Stock Companies collect information, and they see that the information conforms with the Act and they send us reports periodically. We refer to them regarding details, *e.g.*, of misclassification, paid up capital, etc., when we have reason to doubt the accuracy of any return.

Q. You simply analyse the return?—A. We analyse, consolidate, and publish the returns. The Blue Book is published as "Statistics relating to Joint Stock Companies in British India and Mysore."

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. Do you get from the Bombay Chamber of Commerce correct returns about presses?—A. It is only as regards certain Native States, namely, Hyderabad, Mysore, Rajputana, and Central India, that the Bombay Chamber gives this information, and we have not, I regret to say, been successful. The information from British provinces (which include returns of Native States within their boundaries) is fairly satisfactory and will improve as time goes on. The Secretary of the Manchester Federation (Mr. Arno S. Pearse) wrote on 28th January 1916 as follows:—

The value of your compilation will be soon recognised and I trust that within a comparatively short time your Press Returns will be a reliable guide as to the size of the growing crop of cotton in India.

Q. As you know, in the Native States, there is a lot of cotton grown and we do not get statistics about it?—A. Exactly so. The difficulty is this. When we started this system of cotton press returns, the Bombay Chamber undertook to get statistics from certain Native States and we undertook to get them from the British provinces. But we are not getting complete statistics for the Native States. The Bombay Chamber of Commerce say that they have done their best and they cannot get any more. In order to improve matters greater co-operation is necessary, but Government consider it advisable to wait for the present and make the most of the figures supplied through the Bombay Chamber of Commerce. We get returns of area and outturn from Native States and we are attempting to get these more accurate. This involves patience as many States have not the requisite staff, and it is the policy of Government not to "importune the Durbars to perform a duty for the discharge of which they may be ill-equipped."

Q. So you seldom get very much information about cotton or anything produced or grown in the Native States except Mysore?—A. We get agricultural returns once a year from certain Native States and they are published in Volume II of Agricultural Statistics, and we also get periodically on prescribed dates returns from certain Native States for the following forecasts. (We publish 24 in all, Native States included):—

Rice—

Due dates.

1st	October 20th.
2nd	December 20th.
Final	February 20th.

	Due dates.
<i>Wheat—</i>	
1st	January 31st.
2nd	March 15th.
3rd	May 30th.
Final	August 10th.
<i>Cotton—</i>	
1st	August 15th.
2nd	October 15th.
3rd	December 15th.
Final	February 15th.
<i>Linseed, Rape and Mustard (Spring Oil seeds)—</i>	
1st	January 1st.
2nd	March 15th.
Final	June 1st.
<i>Sesamum (til or jinjilly)—</i>	
1st	September 1st.
2nd	October 20th.
Final	January 15th.
Supplementary	April
<i>Groundnut—</i>	
1st	October 20th.
Final	February 15th.
<i>Indigo—</i>	
1st	October 15th.
Final	December 20th.
<i>Sugarcane—</i>	
1st	August 20th.
2nd	October 20th.
Final	February 16th.

Q. Do you consider that the values of crops returned as 12 annas or 16 annas and so on are correct?—A. No. We have taken that up and with the permission of Government I put in a circular No. 1083, dated the 5th December 1916, which was issued on our suggestion (*vide* Appendix A).

Q. Are you talking of the Native States only?—A. No. We have taken that question up as to the correctness of the yield of crops with local authorities. The question is now being carefully considered. There is a great tendency to underestimate, but it involves a good deal of change now in our present procedure. Any change that we make at the top filters down to the bottom and one must therefore walk warily.

Q. Will it take a year or two?—A. Yes. Perhaps even not so long before a beginning is made.

Q. About trade representation, do you get all the information through the British Attachés in the different Governments?—A. When necessary. For example, we get from Mr. Crowe in Japan returns of rice crop and things of that sort. Most usually we get them through the India Office. I have referred to this at some length in my memorandum on commercial intelligence.

Hon'ble Pandit M. M. Malaviya.—Q. In paragraph 8 of your Memorandum on Statistics, you say, "The statistics of wages are those paid to certain classes of labourers and artisans in districts and in certain railways (East Indian Railway and North Western Railway) and Government establishments as well as in certain private industrial establishments in various parts of India.....The statistics of wages paid in industries are meagre and refer generally to a representative mill in the chief locality of the industry." This information would be misleading then if it was taken as showing the average industrial wages in India?—A. That is so, but the question has been taken up with Government and after the war I hope to follow the practice similar to that followed by the Labour Statistics Department at the Board of Trade. We shall then get from industries, etc, correct figures. We will send out forms and get them back quickly and tabulate, examine, and publish them.

Q. You say in paragraph 29 of your Memorandum on Statistics about the distribution of statistics, "A statement has been prepared to show the distribution of the publications of the department (1) in India and (2) abroad." Is this distribution abroad made for payment or free?—A. It is made free. We generally get Blue Books free from State departments and from institutions abroad. These are of the greatest value to us, and we send them ours in return.

Q. It is only to those that you receive information from, that you send your publications free?—A. Not always. If we get a request from any big institution abroad, we would, if it is a good case, put them on the free distribution list. The main point, however, is that we get from that country a *quid pro quo*.

Q. Do you supply these statistics free to the people in the United Kingdom or outside it also?—A. Both to the United Kingdom and also outside, to the Statistical Bureaux and various associations, libraries, newspapers, etc., all over the world.

Q. Don't you think that they should pay for them if they want them?—A. I do not think so, because they are not numerous and most of the countries follow the same procedure as we do.

Q. You say that Government officers receive 44 per cent of the publications. That, of course, must be free?—A. Yes.

Q. Do you think the distribution of your publications to so many officers all over the country is of any good? Would you not rather confine the distribution to men in trade who are likely to be able to utilise it?—A. Please refer to Appendix I of my memorandum on statistics. They find these statistics often very useful, especially, for example, to find out what the area of each crop in their districts is. They would like to have the Blue Book handy. This list is revised from time to time by each Local Government. Recently a revision has been effected with a view to economy.

Q. Do you send statistics regarding particular subjects which are likely to be of interest to an officer, or do you send them *en bloc*?—A. The Local Governments decide what publications would be of use to each class of officer and they send us a list and we issue accordingly.

Q. You say at the end of paragraph 30 of your Memorandum on Statistics, "We have sometimes been asked by firms and Chambers to telegraph information such as that relating to the forecasts, but under the orders of Government we cannot telegraph at Government's expense to public bodies and associations or to private firms".....?—A. The point is simply this, we think that our job is finished when we publish the information and let the Associated Press and other bodies publish it as they like.

Q. And it also ensures all the firms getting information about the same time?—A. Yes.

Q. Otherwise, if you supplied information to particular firms by telegraph the question might be raised of their gaining a particular advantage over others?—A. Yes. Sometimes, if the Chambers of Commerce would care to send a prepaid telegram and our forecasts had been published, we would send it to them at their expense.* In fact for the information which we send to the International Institute in Rome we make them pay for the cost of cables. They send us the cost from time to time but the Government of India are only one of the very few Governments which make the Institute pay, and there are 55 adhering Governments.

Q. With reference to what you have said in paragraph 31 of your Memorandum on Statistics, do you think that the publication in gazettes, which you speak of, would better help the distribution of this information?—A. It might in many ways. For example, to advertise our statistics it would be better. This is one of the post-war questions. I may say that the Labour Statistics Department at the Board publish their statistics in a Labour Gazette very promptly. They bring out on the 15th of every month statistics which have been compiled up to the 13th. The statistics are explained in very readable notes and the information in the gazette is of a kind that ordinarily requires working up. They get figures from all sorts of industries and work them out. It is a very excellent piece of work. In this connection please see paragraph 31 of my Memorandum on the Collection and Distribution of Statistics. At the present time the *Indian Trade Journal* publishes paragraphs and tables for us. We have recently introduced a system by which the Journal points out any of our publications of interest to trade.

Q. In paragraph 9 of your Memorandum on the Commercial Intelligence Department of the Board of Trade, you say, "lastly it may be necessary to emphasise one or two points connected with the Commercial Intelligence Department," and you say that the duties of the branch are concerned primarily with external trade and that the interest of the producer, other things being equal, is given preference over that of the merchant or carrier where these are in conflict. Have you got similar rules here?—A. Mr. Lindsay, who is in charge of Commercial Intelligence, would, I think, explain fully and better than I could the system that is followed.

Q. You then say in paragraph 9 (6) of the same Memorandum, "It should be pointed out that the most valuable information which is given by the Commercial Intelligence Department to the trade is never published at all. It goes to those interested and is kept away from foreign competitors who are extremely eager to get such information." So far as you are aware, does a similar rule obtain in our Commercial Intelligence Department?—A. Mr. Lindsay would also perhaps be in a better position than I am to answer that.

Q. Are the rules that you refer to in the same page definite rules laid down in writing or do they represent the practice of the department?—A. It is the practice of the department of the Board.

Q. In paragraph 7 of the same Memorandum you say, "His Majesty's Trade Commissioners are wholtime officers unlike the trade correspondents. They furnish people in the Dominions

* The Government of India have agreed to the proposal made in paragraph 33 of the Memorandum on Statistics and Chambers have been asked for lists of firms, etc.

desiring to export to the United Kingdom, with any information, subject to the exception that their primary duty must always be to the United Kingdom trade". That also is the practice?—A. Yes.

Q. Is there no definite rule on the subject?—A. It is understood. It is very well known.

Q. You also say in paragraph 9 of that Memorandum, "The Consular officers are authorised to give the same assistance to firms in the Dominions as to the United Kingdom firms except that the Consuls are principally commissioned to serve the trade of the United Kingdom"?—A. Yes. That is clearly understood. Please refer to paragraph 9 (9) of my note on Commercial Intelligence.

Q. In Appendix I of your note on Commercial Intelligence you say about the Commercial Attachés that their functions consist exclusively in assisting British traders and furthering the interests of British commerce?—A. It is capable of very wide interpretation. I have always found that any enquiry made to them have always been answered readily and completely so far as Indian trade is concerned. British interests, however, come first.

Q. Their instructions are summarised in the next paragraph of Appendix?—A. Yes.

Q. In Appendix IV of the same note you say that Consuls are permitted to give all possible assistance in the matter of trade to the Canadians?—A. This is a special arrangement made with the Canadian Government subject to the conditions laid down in the report. Please see paragraph 2 of Appendix IV to my Memorandum on the Commercial Intelligence Department of the Board of Trade.

Q. No such arrangement has been thought of yet with regard to India, so far as you are aware?—A. I am not aware of any such arrangement. When I was at the Board of Trade in 1913, I was told that the Board had been considering the advisability of having their own representatives in India. The matter, however, did not fructify.

Q. Are you aware of any such arrangement existing between the Board of Trade and any other Colony?—A. The arrangement with Canada was the only one up to the time of the war. Since Sir William Clark has taken charge, there might probably have been changes, but I am not aware of them.

Q. In view of the extensive import and export trade of India do you think that the time has come when Indian representatives of Indian trade should be appointed in other countries?—A. I think that a Trade Commissioner should be appointed for the United Kingdom.

Q. And outside and beyond it, in any other countries, for instance, in Canada, in Australia, in Japan?—A. I should like to see a beginning made in the United Kingdom and from the experience gained therefrom we could extend it later. Ultimately we might have a service of our own, I mean for India, but I should like to see a beginning made with the United Kingdom. That is my personal opinion.

Q. Mr. C. E. Low.—You are the compiling and not the collecting authority in the matter of most of the statistics?—A. Yes.

Q. Is it not the case that forecasts of some of the commercial crops are subject to very probably deserved criticism by the commercial public in certain cases, particularly of cotton and jute?—A. Yes, I quite agree. As regards cotton, wheat, oilseeds, rice, etc., we bring to the notice of provincial authorities any inaccuracy or inconsistency regarding the estimates which may be found on an examination of the returns or which may be pointed out by any interested party, e.g., we recently pointed out low estimates of cotton in Hyderabad and Sind to the local authorities, and in recent years we have found this to result in much better forecasting. There is a proposal to strengthen this section of the office and we shall then be able to exercise greater vigilance over local reporting agencies. As regards jute, this is left to the Director of Agriculture, Bengal, who publishes the consolidated forecast of Bengal, Bihar and Orissa, and Assam. The Director of Agriculture, Bihar and Orissa, and the Director of Land Records and Agriculture, Assam, furnish their returns to the Director of Agriculture, Bengal.

Q. In the case of cotton, are you aware of any country which has made any systematic attempts to estimate outturn by counting the bolls on the plant?—A. I am not aware. I have made a reference to the Departments of Agriculture in Washington and Cairo regarding the details followed as regards cotton forecasting.*

* Witness subsequently forwarded copies of correspondence on the subject, the relevant portions of which are the following:—

(1) Extract from letter No. ⁹⁶/₂₅₋₆₋₄, dated 7th April 1917, from the Consulting Agriculturist, Ministry of Agriculture, Egypt, to the Director of Statistics.

"An additional factor is taken into consideration for the establishment of these preliminary forecasts, namely, the result of the examination of bolls made shortly before and during the time of picking, from samples received from each cotton district, by the head officers of the Technical and Scientific Division of the Ministry, enabling the counting of bolls on the plant and a checked estimation of the damage caused to bolls by insect pests."

(2) Extract from letter, dated 13th April 1917, from the Chief of Bureau, United States Department of Agriculture, Bureau of Crops Estimates, Washington, D. C., to the Director of Statistics.

"The basis of our crop estimates is reports from a large number of voluntary crop reporters It has been mentioned by a few that the number of bolls on plants is counted, but I do not believe that many of our reporters pursue such systematic and specific method of arriving at an estimate."

Q. Do you know if any other countries have any definite system, experimental or otherwise, for forming a basis for forecasts?—*A.* In the United Kingdom they use the Excise officers who go about in their own areas and collect information, and then of course, they utilise to a greater extent, than we do out here, the experts. At the present time we do not use in the way that we should the professors of the Agricultural Colleges to get reports. I know of no reports from any agricultural expert about the condition of the crops round about his college or the area with which he is acquainted. Suggestions have, however, been made to Local Governments in connection with wheat forecasts for utilising the services of the experts of the provincial Agricultural Departments as far as practicable for supplying the necessary information to the Local Directors.*

Q. Generally, the Local Governments in compiling them make use of the knowledge of the Deputy Directors of Agriculture?—*A.* I do not think that is general.

Q. The forecasts depend simply on the opinions of local officers of varying degrees in the official hierarchy?—*A.* Yes. On the whole it is not badly done, but the estimates of outturn are underestimates owing partly to the fact that Indian cultivators and village officers are generally pessimistic in their crop estimates and have an ingrained tendency to depreciate the present estimate in comparison with the past, and partly to the fact that the subordinate agency finds it difficult to regard 100 per cent. or 16 annas as representing a normal crop. (Please see the Government of India circular No. 1083-252—1, dated the 5th December 1910, Appendix A.)

Q. A lot of officers are frightened by the figure of 100?—*A.* Most of the officers regard 100, which we have prescribed, not as a normal crop but something above a full average, and the result is that our estimates are often very much below.

Q. Turning to the question of wages returns, apart from the mill and factory labour, do you think that the returns of agricultural and village labourers are in a satisfactory state at present?—*A.* I do not. I have looked into this carefully and the question is at present with Government. As you know, some of the provinces have quinquennial wages returns. We have gone into that and analysed those figures, and on the whole, I think the machine which only works once in five years creaks badly, and it has not been altogether the success that I anticipated when it was first introduced.

Q. The annual returns are not very satisfactory. Do you think that anything can be done to improve them?—*A.* By giving clearer definitions and carefully drawn up forms in the vernacular, if necessary with explanatory footnotes, etc.

Q. That could be done a good deal better by making them fill up returns in printed forms with explanations?—*A.* Yes.

Q. Do you think its importance justifies having a few special officers—I do not say of very high status—to compile or inspect the compilation of prices and wages returns?—*A.* Yes, and those officers would also be useful in the offices of the Director of Land Records and the Director of Agriculture.

Q. Do you know of any such men?—*A.* No. Mr. Keatinge (Director of Agriculture, Bombay) suggested to me that if he could have a statistical officer on Rs. 200 he would be of great assistance to him in his forecasts and other statistical work, which Mr. Keatinge has to do for us. His office prepares these forecasts and it is very difficult for him to go into them with the thoroughness which he sometimes would like to do. I think this would apply to some other Directors of Agriculture and Land Records.

Q. Would you have a man on Rs. 200 who would simply be taught to make enquiries intelligently and also taught to find out what the price was or the wage was, or would you have a better man than that, with a more general economic knowledge, to go round and inspect the work generally and make any general enquiries of an economic nature relating to prices and wages?—*A.* It would be an advantage to have an officer of higher qualifications and pay.

Q. As regards the receipts of jute into the Calcutta block, a very large number of mills were left out which made the information of little use for the purpose for which it was wanted?—*A.* Since May 1914, I have shown in a footnote the imports of jute into those mills and I have prepared a comparative statement of our figures and the Chamber's figures.

Q. Have you any knowledge as to the relative amount of use which the commercial public or the various classes of it make of your different returns on commercial and economic subjects?—*A.* No, but only through the distribution lists and enquiries and references to our return. I should say that the monthly accounts and the forecasts are of special use to trade.

Q. Have you ever discussed this with commercial bodies from time to time?—*A.* Yes. I have had suggestions once or twice of the jute business men and they have often said to me, "Why don't you publish statistics which are published by the Chamber of Commerce, and could you not do it better and quicker?" and we have been considering that question.

Sir F. H. Stewart.—*Q.* Could you do it better and quicker?—*A.* As regards jute imports into Calcutta we publish weekly figures. We could publish a monthly statement about one or one and a half weeks before the Chamber does it. As regards the accuracy of the Chamber's figures I think we would be more accurate. I have recently had occasion to go into the salt imports into Calcutta and found that the Chamber of Commerce had gone wrong in one case

* Orders of the Government of India were issued in regard to this in their circular No. 210-C., dated 7th February 1917.

by a hundred thousand maunds, and in another by over a million maunds. This is rather an important question from the administrative point of view. The discrepancy between our figures and the Chamber's figures was noticed, and on an examination of the Chamber's figures it was found that the mistake of one hundred thousand maunds was in their progressive figures, and that of over a million maunds was due to their publishing in one of the issues of their price currents figures of tons as maunds. I think we could easily publish a statement for the Chamber of the monthly jute imports.

Q. You could publish it more quickly also? But would those statistics command the same confidence as the Chamber of Commerce figures?—A. I think they would command the same confidence. Our figures would be more complete than the Chamber's. We include Kidderpore Docks and the Chamber does not do that. We include imports into the mills served by the East Bengal, East Indian, and Bengal Nagpur Railways. The Chamber includes import into the mills served only by the Eastern Bengal Railway and excludes those served by the East Indian and Bengal Nagpur Railways. Another point is that the mills might be willing to give us figures of jute bought over the jetty, whereas they would not give them to the Chamber.

Q. The point I am getting at really is that if you could do it more quickly and better than the Chamber, then the Chamber might discontinue some of these things?—A. Yes. It is only recently that we considered this point.

Q. But you have not taken it up with the Chamber of Commerce?—A. No.

President.—Q. Would it not be possible to publish a figure which is known not to be accurate but sufficiently precise for business men to frame their ideas? For instance, as regards the statistics of minerals, I could say in November what the probable production of the next year would be. That is done in the Colonies. You get provisional figures issued almost immediately the year is closed, but everybody knows that it is not the final figure?—A. It would be roughly correct. Of course, our monthly returns of trade fluctuations, i.e., of imports into the ports of Indian staples, go out seven weeks after the date to which they refer, but those are audited figures—and show the sources by provinces. Unaudited total figures similar to those published by the Chamber could be got out within five or six days after the period to which they refer. These, however, will represent trade for four weeks. I have made a comparison between the Chamber's monthly figures and our unaudited weekly total figures for four weeks and they are roughly correct, so that in place of the Chamber having one monthly statement, they would have weekly figures *plus* a monthly statement based on weekly figures.

Mr. C. E. Low.—Q. Can you tell me why a great deal of detail is given as to things turned out by cotton mills and absolutely no information about jute mills. Is there any essential difference between cotton and jute trade?—A. The detailed statistics of production in cotton mills are compiled from monthly returns which the cotton mills are bound to furnish under the terms of the Cotton Duties Act, but there is no law binding the jute mills to furnish similar returns. I should like to have returns. They would be of use. Some day when we have a Census of Production Act this will be possible.

Q. Do you know if the cotton trade finds that information useful?—A. I think they do.

Q. Is there any particular reason why the same thing is not done for jute?—A. Because we do not have an excise duty.

Q. Your agency is to some extent a compiling agency, and you have had to do a certain amount of interpretation of statistics. How do you take steps to get yourself in touch with them?—A. In various ways: (1) by keeping in close touch with experts, e.g., in each trade, (2) by touring and settling points with Local Governments and their officers, (3) by meeting Committees of Chambers of Commerce, etc. I have no Assistant Directors and this makes it impossible to keep in touch in the way I sometimes would like. In this connection, please see paragraph 25 of my Memorandum on Statistics.

Q. You speak of the Committee which advises the Board of Trade about the different kinds of statistics. Do you think that anything of that sort would be useful to your department?—A. Yes. I have business men as already stated whose advice I avail myself, when necessary. At present I have a list of men well known in their own line of business on whose judgment I place great reliance. I always get invaluable assistance from them with regard to the purely trade point of view.

Q. As you mention it in connection with the Commercial Intelligence Branch, would it be useful to the Commercial Intelligence Department?—A. Yes.

Q. Local Committees advising them?—A. Yes. At present we simply depend on various individuals, but if we had a strong body of men not appointed simply because they are members of an association or anything of that sort but because they are well known as experts it would be useful. The Advisory Committee of the Board of Trade is an expert Committee which advises the Board from its own knowledge. The 19 commercial members are carefully selected and represent important branches of trade in which they are experts. They do not act as delegates, but are rather a combination of a great amount of commercial knowledge. The details of the Advisory Committee will be found in paragraph 8 of my note on the Commercial Intelligence Department of the Board of Trade.

Q. The Board of Trade do not rely on organized associations in trades or industries?—A. No. The Board consults its own Advisory Committee. A number of members of the Com-

mittee, however, are also members of the Council of the Association of Chambers of Commerce, and the Chairman of the Council of the Association of Chambers of Commerce is on the Committee as a matter of course. The Committee, therefore, is a link between the Board of Trade and the Chambers of Commerce. Please refer to paragraph 8 of my note on the Commercial Intelligence Department of the Board of Trade.

Q. You think that the other system is more efficient?—*A.* Yes. It is very helpful.

Q. How do you think it would work here?—*A.* It might be useful to have a small workable Committee meeting once a month or so. Everything of importance, before it comes to the Committee, would be considered by Government. Please see paragraph 8 of my note on Commercial Intelligence. We have in India the Committees of the Chamber who have done excellent work in the past when consulted by Government. That point has to be remembered when one is thinking of the advisability of having Advisory Boards.

Q. In speaking of the Commercial Intelligence Department of the Board of Trade in paragraph 9 of your note, you say that the interest of the producer, other things being equal, is given preference to that of the merchant or carrier where these are in conflict. It was said for a long time the Commercial Intelligence Department refused information to the producer because it was thought to injure the middleman?—*A.* I think it may be taken on the whole that they look to the producer's interest first and foremost. This was brought out very clearly by the Permanent Secretary to the Board in his evidence before the Dominions Royal Commission.

Q. You think the practice corresponds to the theories enunciated by the Permanent Secretary?—*A.* Yes.

Q. You are speaking in the same note of exhibitions of samples and catalogues of enemy trade. Do you think that a similar thing may be useful in this country? Do you refer to enemy trade or external trade?—*A.* Enemy trade I had in view.

Q. Do you think that it will be useful after the war, or don't you think that it will be a cheap advertisement of the enemy trade?—*A.* It does cut both ways, but it is very interesting to see the way in which the Germans did business, the way in which their catalogues of various things gave details, their careful study of the market, their ability to give long credit, and the assistance given by their Grossbanken. The information might be given to firms in a way that it would not act as a cheap advertisement.

Q. The United Kingdom is a much more producing, and India a much more consuming country, unfortunately at present, and do you think that a great benefit would result, or injury?—*A.* The benefit would not be so great certainly as in the case of the United Kingdom. It is worth attempting.

Q. Do you know of any departments like the Department of Agriculture or the Geological Survey who watch the statistics for this reason, that there might be a mineral which is being produced, or there might be a special crop being introduced to the public by the Agricultural Department. Do the departments watch that?—*A.* No. Not as a rule. There are, however, exceptional cases. Whether this is done or not depends as a rule on the Heads of the departments.

Mr. A. Chatterton.—*Q.* Have you got any technical assistance in classifying articles dealt with by importers or exporters? When the war broke out, the imports of potassium cyanide ceased and there were no returns of cyanide given but they were lumped together with sodium compounds?—*A.* Articles are shown in details in Bills of Entry and Shipping Bills which are dealt with in the Custom Houses. They have more or less expert officers (Appraisers) and the classification is made with their assistance. When, however, we have a moot point in classification in which any expert department is concerned, we always refer to that department, for example, the Director of Geological Survey would be consulted or the expert who dealt with that particular article.

Q. How are you going to deal with changes of this kind which not infrequently occur in the procedure? One sort is substituted for another and unless you have an expert to indicate what is the nature of the compound that has been employed:—your return, I think, shows no cyanide is imported into India at all now, whereas it really comes under sodium compounds?—*A.* Such changes are, as stated already, dealt with in the Custom Houses. Our returns of imports show cyanide of potassium separately under chemicals.

Q. Why I raise this point is that some arrangement should be made so that these returns for every half-year or every year may be revised to see that they are giving exactly the information that they are intended to convey in technical matters of this kind?—*A.* In practice this would be difficult. I should require a number of experts, and even then errors of detail such as you have mentioned would be possible.

Sir D. J. Tata.—*Q.* Is any commercial intelligence ever published in the vernaculars?—*A.* No, but this is subject to correction by Mr. Lindsay. We have had requests from time to time to publish in the vernaculars, but that is chiefly regarding a manual for crop forecasts and things of that sort. Sometimes the Native States write to us, "Will you send fifty copies of a Hindi translation of such and such a return?" and so on. We have recently printed Hindi forms of returns of live stock for use in Native States. Our aim is to assist Native States as far as practicable by translating forms or manuals containing rules for the compilation of statistics. The more we can assist Native States in regard to the collection of statistics and the more we co-operate with them, the better will be the returns, and at the same time the States will be more willing to furnish returns.

Q. There is no demand for any such information?—A. So far as I am aware there is no demand.

Hon'ble Pandit M. M. Malaviya.—Q. Do you say that there is no demand yet, or the matter has not been looked into?—A. We have got no request.

Q. That is probably because they do not know that they would be supplied in the vernaculars. There is a large amount of export and import trade by people who do not know English, and in their case information supplied in the vernaculars would be helpful. If they knew that they would get them, I think they would subscribe for them.—A. I shall note this.

Appendix A.

Copy of Circular No. 1983-252-1, from the Government of India, Department of Revenue and Agriculture, dated 5th December 1916, to all Local Governments and Administrations.

I am directed to address you regarding the method of framing estimates of outturn for the purposes of the forecasts of crops, a subject which, with the development of Indian agriculture, is assuming steadily greater importance.

2. In 1884 when instructions for the preparation of wheat forecasts were first issued by the Government of India, it was prescribed in paragraph 14 of this Department Circular No. 89-A., dated the 25th July 1884, that the estimate should be made on either the American or the Indian system with reference to an average crop, and that if the latter were employed 12 annas should be taken as an average, and 16 annas as a bumper crop. Subsequently in 1885 it was found that the order was not applicable to all the provinces, and in the same year it was laid down in this Department Resolution No. ^{129-A.}₇₋₁₈₉₇, dated the 6th November 1885, that an average crop should be denoted by 16 annas. Local Governments were again asked in 1892 to adhere to the above system in paragraph 5 of the memorandum of suggestions appended to this department circular No. ⁴⁸₈, dated the 21st December 1892, and were also requested to state, when using the anna fraction in published reports for expressing the probable yield, the outturn represented by that fraction. In 1897 a question arose as to whether the anna notation or the American notation should be used in making crop estimates, and it was strongly urged upon the Government of India that, as the cultivators and village officers entrusted with the duty of collecting the data for crop reports, were chiefly accustomed to the anna notation, the adoption of any other system tended to confuse the estimate, with the result that in some provinces the estimates were never pitched so high as 16 annas or an average crop. The Government of India, therefore, decided (*vide* paragraph 4 of their circular No. 9-27-4, dated the 23rd October 1897) to leave it to Local Governments and Administrations to fix the scale of notation for themselves in accordance with local conditions, the object being to secure that the returns should be in terms of a normal crop. In order to secure conformity with the local usage it was thought that it might even be necessary to use different scales in different parts of the same province. But since the anna standard thus adopted would no longer possess any fixed or uniform value and would, therefore, be unsuitable for use in any published forecasts, it was ordered that in the forecasts submitted to the Government of India or the Director of Statistics the use of anna notation should be entirely discontinued, and the American notation used in its stead, 100 being taken to represent a normal crop and the estimated outturn being stated as a percentage of that crop. Under this system the local reporting agency in each province makes an estimate of the relations borne by the season's outturn to the normal crop either in annas or percentages; the provincial Director on receiving these estimates converts the annas (where the estimate is given in this form) into percentages and calculates therefrom the quantitative outturn of the season with the help of a register of standard normal outturns per acre which is maintained by him.

3. Experience has shown that the yields of crops thus estimated are generally understated, and it appears to the Government of India that the source of error in the estimates of yield lies mainly in the inaccuracy of the estimates framed by the local reporting agency. This may be due partly to the fact that the Indian cultivators and village officers are generally pessimistic in their crop estimates, and have an ingrained tendency to depreciate the present estimate in comparison with the past, and partly to the fact that the subordinate agency finds it difficult to regard 100 per cent or 16 annas as representing a normal crop. It appears to the Government of India that the idea of the reporting agency as regards a normal (100 per cent) crop is very vague. In the circular of 23rd October 1897 referred to in paragraph 2 above a normal crop was defined as "that crop which past experience has shown to be the most generally recurring crop in a series of years; the typical crop of the local area; the crop which the cultivator has a right (as it were) to expect and with which he is (or should be) content, while if he gets more he has reason to rejoice, and if less he has reason to complain." Later in paragraph 4 of Sir James (then Mr.) Wilson's circular letter No. 13-324-1, dated the 16th October 1905, regarding the preparation of the season and crop reports, the term "normal" was defined as the "figure which in existing circumstances might be expected to be attained in the year if the rainfall and seasons were of a character ordinary for the tract under consideration, that is, neither very favourable nor the reverse." This definition was adhered to in paragraph 3 of the Hon'ble Sir (then Mr.) E. D. MacLagan's circular No. 7-78-1, dated the 13th March 1907, regarding the improvement of the wheat forecasts. The

Government of India understand that in the United States of America a 100 per cent crop represents a condition of perfect healthfulness, unimpaired by drought, hail or other injurious agency and with such growth and development as may reasonably be looked for under these favourable conditions. This is described as a "full normal condition," but is obviously a condition above the average. The Government of India have reason to believe that a similar standard is followed by many reporting agencies in India, and that district officers often report 80 or 90 per cent when the crop reported on is really perhaps a normal (100 per cent) crop according to the official definition.

4. The Government of India think it desirable that the system should be placed on a sound basis and they will be glad to learn what is the experience of Local Governments and Administrations in the matter, and what measures are considered possible for the improvement of reporting either in annas or in American notation. They desire to know (a) at what stage the anna (if the estimate is returned in annas by the reporting agency) is converted into percentage, that is, by the primary reporting agency, by the district officer, or by the provincial Director; (b) what notation is preferred, the anna or the American, and, if the former, how many annas should be taken to represent the normal, or if the latter what should be taken as the normal; and (c) by what means the meaning of this normal may be impressed on the primary reporting agencies, e.g., by printing in bold type in the vernaculars, etc., on the forms the meaning of normal.

5. I am accordingly to request that you will be so good as to furnish the Government of India with the opinion of the Governor in Council
Lieutenant-Governor in Council
Lieutenant-Governor
your opinion on the above points.

WITNESS No. 185.

Hon. Mr. W. A.
Ironside.HON'BLE MR. W. A. IRONSIDE, *Merchant, Partner in the firm of Bird & Co., Calcutta.*

* WRITTEN EVIDENCE.

From my personal experience the finance of industrial enterprise has presented little difficulty, provided the essential factor of careful development and commercial possibilities has been studied. Moreover promoters, to carry weight with the public, must possess some credit for commercial management. This takes time and costs much, and some people who fail to bear this fact in mind are apt to blame other causes and reasons for their disappointments.

Financial aid.

Subscriptions are naturally most readily obtained from European sources, though Indian subscribers are welcomed. Many people, however, seemingly prefer to wait until scrip is dealt in on the Stock Exchange, that is they join in after the scheme has been brought to fruition, or, oftener still, they prefer to accept wildly speculative rumours in the hope of getting rich quick. Such people bother little about the enterprise itself, and do not even care whether it is profitable or not and often do not even know where it is. The present unhealthy uncurbed spirit of speculation is, I hold, injurious to honest industry; so much speculation of this class proves disastrous and later the industry itself is blamed for results of which it is innocent.

I have had no experience of Government financial aid and I am opposed to the idea *per se*. If a scheme is really valuable it should be worthy of complete public support or none. It moreover restricts the education of the people by inducing enterprise to be spoon-fed and hot-house forced; we have enough lack of energy, grit, and pluck already without fostering it further. But I do consider all new industry (and in India all industry may practically be considered in its infancy) can be and should be assisted by Government in many more practical ways. I also do not believe that Government wish to interfere unduly, whereas were financial aid to be accorded dual control would be evolved and the result would certainly lead to chaos.

Industry, and in this I include agriculture as the greatest of all, requires assistance at some time or other, and no industry can be beneficial to the State or community unless it be successful and profitable, but in offering any suggestions to this end I wish it to be understood that in all things the happy mean is the goal I desire to aim at, an end which we are often apt to disregard. I hold that as we have arrogantly stood by theories and so-called moral sentiments which, run to death, have nearly led to our national ruin, we may, as a result of the present war, be led to exaggerated views in the opposite direction. Instead of serving to correct our difficulties this may only accentuate them and must be guarded against.

I consider, therefore, that the quasi-financial points raised in the forefront of the list of questions would, in dealing with this country's problems, have been better relegated to the last page; they could then, I think, have been more easily dealt with.

All industry is beneficial to the State and community but I desire to see 'industrial commerce' separately considered from 'mercantile commerce,' the two being antagonistic. The first only is the producer of benefit to the State, whereas the merchant's view must necessarily be confined to buying in the cheapest and selling in the dearest markets; the

* See also additional written evidence printed after oral evidence.

merchant or middleman fails to consider the internal producer. Obviously there must always be divergent interests. To my mind the multitude of merchants has, to a large degree, governed the country's policy towards industry.

Industry in this country is in its infancy and is not appreciated at its proper value. It cannot be managed by unpractical or scholastic methods. Financial aid in any form can only be a means to an end, and here I think Government put the cart before the horse by failing first to consider, to a full realization, the practical value of each separate industrial scheme to the State or community. This has been the weak point in my opinion of all present measures of industrial progress.

Money grants-in-aid, loans, supply of plant, are mere charities which end nowhere, and carry no incentive. Bounties and subsidies may in some instances be very necessary to assist nascent industries which, at starting, are crippled by one or more disabilities, and these are multifarious in this country though they are rarely found wholly in combination.

Free grants of land, reduced taxation, free and untrammelled cheap transport facilities, and guaranteed dividends are I think some of the more wholesome methods in the case of industries vital to the national safety, economic or military, and could safely be worked on much the same principle as now governs railway finance; but these should cease after a scheme had secured a solid foundation.

I do not generally favour Government participation in share capital but it might be found desirable in special instances; but Government capital should be paid back at the earliest possible date, proper regard being paid for the share of the goodwill which Government had created.

Government, during the period of investment and risk, naturally should be represented by one or more directors and auditors whose care should be that after completion proper provision should be made for depreciation and financial solidarity out of profits.

Pioneer factories should only be started if public interest cannot be obtained, the audited working results should be made public and the concern offered to the public for purchase as a going concern as soon as possible.

Demonstration factories can be of little real value either to Government or as a means of educating the public, they could only be on a model scale and I would personally distrust any financial results from model concerns. Raw material being available, the necessary technical guidance can be obtained by paying for it, and people who want pioneer factories are usually those too lazy and unprogressive to find this for themselves. Personally, I do not embark on any industry until I have first made all possible efforts to test its value, and I endeavour not to start until there is a sufficiency of capital to bring it to fruition. I agree, however, that we all make the fatal mistake of cutting our working capital too fine. This is sometimes done in order to interest investors who naturally desire to see a prompt and large return on their investments. In short we try to promise too much. One of the most serious instances of this error of a shortage of original block cash expenditure and working capital is the coal industry.

I have an idea there is danger at the moment that we are trying to force the pace, and all this talk of pioneer and demonstration factories betokens an unhealthy anxiety to run before people have learned to walk.

I have always found existing financial organizations adequate for my purpose, provided ordinary guarantees and security can be offered. An extension of the Charter of the Presidency Banks might allow them to take a somewhat greater share in the coming industrial expansion of the country. I consider the average bank manager in this country in advance of the British banker in providing financial assistance. The managing agency system has been, and is, to my mind, a considerable factor in many successful ventures, in this part of India at any rate. Powerful firms, by reason of their large stake in enterprises, often protect a languishing or difficult scheme from premature liquidation by providing that second string of security which a Board of Directors alone could not provide and enabling the scheme to weather the storm. Prior to my arrival in India I held a different view, but experience, sometimes bitter, has led me to view this method of business management differently, at least as to its value in industrial development.

I have little knowledge of village or home industries and I see little value in promoting home industries which must compete on unequal terms with the large factory. It has often appeared to me that the Indian handicraftsman has lost much of his old skill, particularly in artistic work, much of which is now being sloppy and ill-finished. Co-operative associations assisted by Government might be the means of rectifying this in time, but it is hopeless to expect one man to look after everything, for small industries are diverse, and each one requires and should merit individual care and attention. The question naturally arises, where is the money to come from for all this sort of thing; Government cannot do everything. Co-operation both as to finance and education on soberly conducted lines would undoubtedly be productive of excellent results. Agriculture, in all its branches, would to my mind most readily respond to co-operation.

I am strongly opposed to Government competition with private enterprise in any form. It is distinctly unfair, and it is bound to have the effect of choking enterprise. Instances which have come before my notice have caused bitter resentment and we must have them altered.

My principal experience has been with minerals. Technical advice from properly constituted departments must obviously always be productive of progress. The Geological Survey of India has, in recent years, done great work in spreading a more comprehensive knowledge of the country's resources, but is hopelessly under-manned. At the same time we cannot expect an encyclopaedic record of everything that exist in such a vast country. We are apt to suggest that Government should force the pace whereas the country is not educated yet to take full advantage of a multitude of information. Furthermore, before development can take place, we must first be certain that a sufficient market exists, not to mention transport facilities.

Technical aid.

I have found some old geological records to be so inaccurate as to be worthless, leading to expenditure which is unfair to the prospector, and I would go as far as to say that practically all geological records more than twenty years old should be re-examined and verified.

Government technical and scientific experts should only in exceptional cases be lent to private firms or companies, for such aid, after the purely initial stages, is rightly the duty of the industrialist. There are always people ready to accept aid, and many indeed would like to get all their work done for them and are equally ready to reap all consequent gain.

We scarcely need to talk of extensive research work in India yet, for Britain herself has scarcely more than commenced to give the matter attention. We are short of scientific men of experience, for their numbers have been so few. Most of our scientists come out young, with only a smattering of training, and are grafted and absorbed into a country where the demands on their time and work is so great as to prevent methodical enquiry into the multifarious subjects which they are asked to deal with. The experience gained in the last few years will probably be put to greater use later, but we must first place our preliminary investigations on a sound basis before it can ever be possible to proceed to research. Consequently, for the present, I am inclined to depend on the established laboratories in Europe for research.

The Geological Survey is doing all that one can expect of it but it requires strengthening; this must cost money and this is just where Government will have to be more courageous. One so often hears that this or that work cannot be undertaken because there is no money for the salary of a first class man; yet money is thrown about in many other directions far less beneficial to the country. I would like to see an organized effort made to examine closely all possible substitutes for jute and other indigenous products which we are apt to consider safe monopolies. No monopoly exists for long and I know and have seen a possible one for jute which may develop. We have had surely warning enough in the case of indigo and other natural dye products.

The Forest Department requires co-ordination and expansion, the present system of transfer and lack of regard for the "commercial brain" prevents the Forests being developed as they might often be to greater advantage. A closer co-operation between Forest officers and timber companies and more reasonable royalty terms would be conducive to expansion.

I wish to place it on record, however, that the Government technical and scientific advisers seldom fail to give all assistance in their power, but cast-iron antiquated rules stand in the way and are the cause of most of the trouble which is experienced. I trust that the Commission will secure the opinion of the leading practical men engaged in the timber industry, for it is capable of almost indefinite expansion.

Commercial museums can obviously be of considerable assistance to minor industries but few visitors to them are immediate buyers. A major industry could not afford to place any reliance on them for markets, and they probably are the main source for the creation of competition. In that respect, perhaps museums and industrial exhibitions may be said to serve the State. They undoubtedly serve to create and educate foreign competitors, a factor which the British Government have ever viewed with complacency, if not indeed with undisguised pleasure, disregarding the needs of indigenous industrialists. I have as often as not formed the opinion when dealing with Government that they like to see British industrialists struggling against unfair competition, in order to prove an absurd dictum that a new industry can with equal benefit to State and people take the place of a ruined one. Greater co-operation, and an intelligent interest and appreciation of the value of industrial commerce to the State and people and an absence of academical views are now necessary.

Trade representatives should be attached to all British Consulates, but these should be men with special training having a thorough grasp of the trade of the Empire, able to give intelligent advice to prospective buyers. But this should only be a part and perhaps the least important part of their duties. A vigilant watch should be kept for all forms of possible competition, speedily warning manufacturers against the risks of unfair commercial methods, alternative cheaper, inferior, or superior values, patterns, and designs, and generally competition from without. Government departments should, one and all, work in the closest co-operation with local manufacturers. Local purchases should be insisted upon in order to foster the employment of indigenous material and labour, even to the point of paying increased prices. There has been an almost entire absence of any such co-operation in the past, and this has, to my mind, militated severely against industrial enterprise. It is disheartening to be turned back time after time by the stereotyped reply, "We have to buy these stores through the Secretary of State," or, "As this contract exceeds 3 lakhs of rupees it must be sent to London."

Government departments often put contractors or engineers to needless and useless expenditure in the preparation of costly plans and specifications only to be told that money is not available or that the work will be done departmentally.

The present extraordinary method of budget finance, particularly in Railway and P. W. Departments, is one of the most wasteful methods of expenditure it is well-nigh possible to conceive. Expenditure passed at the commencement of the financial year is rushed during the last quarter in order that no credit balances may be left, for if left, they are cancelled on the 31st March and have to be rebudgeted for, and often are not afterwards available. It is a method of finance which strikes a business man as highly unsatisfactory.

The existing Railway Siding Agreement to which industrial concerns are obliged to acquiesce is inequitable and unjust. I am certain similar terms for the provision of transport facilities to people who are risking money in the development of the country would not be tolerated elsewhere. In dealing with railways the risk, worry and work are all on the shoulders of the industrialist and I am certain no blame attaches to the business man for lack of progress in India, indeed the wonder is that we have gone as far as we have.

I am adverse to public money being used by Government for the creation of a department, and in order to cheapen its cost and to force prices down allows it to control 50% of the output by undertaking private work. I refer to the Mining Engineer of the Railway Board. I was the first and keenest supporter of the original action of Government to buy its State Railway coal, the department has been most efficiently run; in fact I would call it the most business-like Government department, but the work is as easy as falling off a log, when the control of the purchase of 50% of the output gives the department undue strength. This position has gradually come about by adding to the State Railways' requirements practically all other Railways in India, Burma, and Ceylon, Royal Indian Marine, and several important private consumers.

It is a smart piece of business and as such as a tax-payer I have nothing to say, but when it is carried to present lengths, when Government have laid themselves out to smash the coal trade by tackling each individual producer in turn bringing down prices practically to cost price, the result has been the restriction of development, and when larger quantities were suddenly needed in a national emergency, the country has found itself in a mess, a case of the bitter bit, and the tax payers, of which the colliery proprietors are a large section, help to pay for the bite.

Land policy.

The existing law relating to land is hopelessly out of date. Mining leases, except when obtained from Government, are at the mercy of many vested interests, and a lessee of a mineral property never knows from day to day when his title will be attacked and he will be called upon to expend large sums in litigation. Some claims may only be described as blackmail, whilst many seem to be brought on the sporting chance of hit or miss. But at any rate the unsatisfactory state of things does no one but lawyers any good and it is a great hindrance to proper development.

I hold the view that the minerals rightly belong to Government and should never have been relinquished. However, as no attempt has ever been made by Government to put this question in order, I hold that the subject must now be considered in the light of the necessity of the State and community. Mineral royalty proprietors take not the slightest trouble to develop their own concerns, and royalty is merely an easy method of drawing revenue without doing any work, whilst the title may be assailed at any time and the industrialist, having most to lose, pays the piper. As a consequence the lessee takes the line of least resistance and often develops on cheap and nasty lines. Sinfully wasteful methods are employed, as often as not a danger to himself and his neighbours. To such an extent is this the case that in the interests of the country I cannot too strongly urge the formation of a Department of Mines, as a portion of the Commerce and Industry Ministry, under a fully qualified and widely experienced Commissioner, a man capable of demanding a large salary. He should be assisted by an able legal and technical staff, capable, amongst other things, of examining and reporting on titles and giving a definite Government guarantee on the same, so that, once a colliery or mine owner has obtained a lease covered by a Government certificate he should be freed from all further hindrance and useless expenditure, and wasteful litigation stopped.

This proposed Department of Mines should be able to supply an equally urgent need by being empowered, in return for legalized titles, to insist on mineral properties being worked in the interests of the State on efficient and modern lines, that present wasteful methods should cease, and that proprietors who failed to carry out its instructions could be dealt with. This Department would undoubtedly cost money but coal, for instance, is valuable beyond price; it is the life blood of everything else and should be conserved; and as one interested in colliery matters myself I would willingly pay a considerable sum annually for the sake of obtaining the benefits possible from such a department. It would redound to the advantage of the individual as well as the State and community and this cannot be said of everything in this country. I could amplify this suggestion, with time and closer examination, by suggesting co-operative ropeways or tramways for the provision of stowing material, delivery of coal to railways, etc. At present the only mineral control is centred in the Inspector of Mines, another hopelessly over-worked body. Indeed present methods are ridiculous and I don't know where we shall end if they are not speedily altered.

From the point of view of the mining industry the existing law is to my view defective in the following amongst probably many other respects.

It is confusing and uncertain with regard to the ownership of mineral rights. This uncertainty has been a fruitful source of litigation between zemindars and tenure-holders during

the last 50 years and although several suits have been fought up to the Privy Council the law has not been settled.

Several zemindaries and tenures in the mining districts constitute what are known as "impartible estates"; and the authorities are hopelessly conflicting with regard to the right and power of the holder of an impartible estate to grant mining leases beyond his own life time.

A considerable number of mineral properties is held by Hindu widows and shebaites of debutter estates who under the existing law have no power to grant leases for periods enuring beyond their own life time, except under special circumstances the existence of which it is impossible for an intending lessee to ascertain.

The law relating to Hindu joint families lends itself to fraud and does not afford adequate protection to persons dealing in good faith with the ostensible owners of joint family properties.

The existing law does not afford proper facilities for the acquisition of surface lands by owners and lessees of mineral rights. Special legislation is necessary to remedy these defects and anomalies; and such legislation should proceed on the following lines:—

- (a) A Department of Mines being a portion or section of the Ministry of Commerce and Industry should be created for each province under a Commissioner with power to decide claims to the ownership of minerals and mineral rights.
- (b) Every person having or claiming title to minerals and mineral rights should be required to file a statement of his claim before such Commissioner within a prescribed time.
- (c) All claims not filed within the prescribed time should be declared barred and extinguished for ever.
- (d) Minerals and mineral rights in respect of which no claims shall be filed within the prescribed time must be declared to belong to Government.
- (e) All claims filed within the prescribed time should be adjudicated by such Commissioner whose decision must be final.
- (f) *(Deleted by witness subsequently.)*
- (g) A mouzawar register should be kept in each district in which the names of the persons adjudged to be entitled to mineral rights should be entered by the Commissioner and such entry should be conclusive evidence of title.
- (h) The register should be kept up regularly and every person succeeding by inheritance to, or acquiring any mineral rights must be required to have his name registered within a specified time from the date of such succession or acquisition.
- (i) The register should be open to public inspection on payment of such fee as might be prescribed by the local Government.
- (j) Holders of impartible estates, shebaites, Hindu widows, trustees, and other limited owners, should be empowered to alienate and grant perpetual and other leases of mineral properties with the sanction of the Commissioner.
- (k) Provision should be made for the compulsory acquisition of surface lands required for mining purposes and full power should be conferred on the Mining Commissioner to carry out such acquisition.
- (l) The Commissioner should also be authorised to decide boundary disputes affecting mines and minerals.

Railways could be fed by cheap systems of tramway and aerial ropeway transport doing Transport away with expensive sidings with the consequent costly loss of valuable surface land and locking up of minerals.

An Aerial Ropeway Bill which would have met the requirements fairly well was formulated 4 or 5 years ago by the Government of Bengal but has been lying untouched at Delhi ever since. We appear to go about everything in the most expensive fashion and cheaper methods of dealing with bulk material in quantities such as ore, coal, stone, etc., should be evolved.

Co-operative systems are possible for assisting neighbouring collieries to handle their output and for the supply of stowing material in order to enable the extraction of all coal and the prevention of surface destruction. This is an urgent matter and I have hammered at it for years. It is all going to cost money, but unless we improve our methods, and people who refuse to do so should be made, we shall find the final results more costly than anything we are able to estimate to-day.

We business people have not paid sufficient attention to the education and training of our employees, particularly as there is much local material at hand, and whilst I do not pretend that every locally educated youth is a genius still more might have been attempted in the past. We have worked along the line of least resistance, our industries have been simple, our methods generally crude, and we have been content to import trained men. The war will force us to alter these views. If industrial progress of real worth is to be obtained we must look about for scientific advisers and train our workpeople, from top to bottom, according as their duties necessitate.

Attempts have been made, I know, by many people, but many existing industries have required little scientific advice or knowledge to produce more or less satisfactory results. The principle, "What was good enough must be so still" has governed nearly all of us. Expansion is now taking place, however, and some recently started schemes will need different methods and knowledge to be brought to bear. Moreover the supply of imported employees will in future be curtailed, and we shall be forced to use our wits to evolve a supply of men to fill many gaps. Engineering in all branches, mining and chemistry will be necessary in practically every form of manufacture or production; consequently the call will be for mostly from these branches of technology.

And as we have to deal with human material which has not environment or traditions to lead them mechanically, as it were, "to follow in father's footsteps," the expenditure of a lot of patience will be needed before we can expect to make much of the average individual; so do not let us try to evolve managers, superintendents, or budding industrialists and financial magnates.

The Railways, Port Trusts, etc., with their large staffs and the families of their employees to draw from, and an abundance of other peoples, money to play with, have had both material and means, and there are probably few other organizations which have any actual experience and results. Many others have tried in a perfunctory way but any such attempts were foredoomed to failure.

The present system of elementary school education is very unsatisfactory, and in this I speak equally of both Anglo-Indians and Indians. The former lack grit and initiative, but I believe, if properly tackled and taken young, are capable of a lot more than they are at present given credit for. The Indians dream of the University and there in most cases the dream ends in bitter disappointment. The younger generation of clerks in our office is far below its predecessors in ability, loyalty, or discipline. It is difficult to get even legible hand-writing, but rather than use their hands in trade they will eke out an inefficient, feckless existence in offices on small and indeed insufficient pay but that generally more than they are worth.

My firm has started a system of apprenticeship which is, I think, an experiment for this country; it concerns only engineering and mining at present, but, if successful, will be expanded.

Four apprentices' homes are built or in course, each to contain 8 to 12 boys from 16½ to 18 years of age. Lads of this age are not as developed as most boys of 14 in Europe; their education is generally on a lower scale.

The houses for mining are in separate districts giving an equal number of distinctive features of training. Transfers at stated periods will be made. The training of the lads will be under a technical instructor whose duty will be to give technical instruction for at least the first two hours of the day on two days of the week, whilst on three days the boys will work themselves on preparation work. I favour morning instead of evening instruction in this climate, the remainder of each day will be spent in the mines or works. The boys are housed and boarded and given small pocket money. Rules for discipline and conduct are provided. The lads are apprenticed. Fixed deductions from pocket money are made and placed in a deposit fund, and at the end of the period of agreement this will, it is hoped, be used by the boys to gain a chance of further education and experience at Sibpur or Europe as may be deemed desirable in each case.

We have started with Anglo-Indian lads because they are more easily housed and more readily respond to discipline but principally because we want to give lads of this birth a chance. I hope some of our Indian neighbours may follow and improve on this idea with Indian boys.

I recognize the still greater desirability of evolving improved workmen and foremen in the engineering shops, and sirdars and overmen in the mines and we hope when the first scheme is set going to find a means of tackling the latter and apparently more difficult problem. Still I am sure it can be solved if we stick to it. An improved form of vernacular instruction would go a long distance towards helping this latter idea, for as soon as the Indian boys learn English their parents want them to be clerks and enter Government Service, or the University, when for all practical purposes, they are wasted and lost.

Official
tion. organisa-

The Commerce and Industry Department has existed for some time but I cannot say that until recently we have had many causes or reasons to be aware of its existence. Personally speaking the whole future of the country appears to depend on a greater appreciation of the material needs of the country and the people. If this Department, in some form or other, controlled practically 75 per cent. of the activities of Government it would be none too large starting with education and so on, through railways and transport, and embracing everything concerning the material requirements of the country. I suppose it is, or has been hitherto, the least important of all Government Departments, and even now it consists of a relatively minute section located 1,000 miles from all the main centres of activity. It strikes me as strange that the appointment of a Director of Industries should be questioned; it is a relatively paltry affair at present but should be and could be made one of the most important posts in each province. A Ministry of Commerce for each province with a far-reaching organization is I consider vital, the Imperial Government, Commerce and Industry Department, being posted regularly with the results, co-ordinating and supporting the requirements and wishes of industry. Railway facilities and working should be under its control. Government might then be in a position to appreciate what is likely to happen ahead and make necessary preparations to meet trouble. Instead of this, at present, continual crises

occur, when the Member for Commerce and Industry, or the President of the Railway Board are dragged down here at short notice to face problems which have grown simply because it is nobody's business to keep the country clear of them.

The Commerce and Industry Department should be a section of Government apart and distinct, possessing all the opportunities for advancement in order to create incentive, instead of as now being used as a post to be pitched into, or a jumping off place for something higher. The material progress and advancement of the country, to my mind, promises to be so vast that this question is one of extreme urgency, and methodical development on no niggardly scale must be ready to co-ordinate the great interests which otherwise will assuredly overlap and choke each other.

I do not think I have found any benefit from the Indian Trade Journal, the most of it being nearly "scissors and paste," whilst by a regular review of trade journals and technical publications relating to any particular industry, interested people can, if they wish, keep abreast of the times. There has been little original material in the Indian Trade Journal and that, often from obviously unpractical sources. I cannot suggest alterations. Industrial or trade journals by Government could only follow similar lines. But surely we have to create industry and trade before there can be any demand for literature, and the existing British journals cover almost all that can be required. Something more might be achieved if the present Trade Journal gave careful extracts from British Consular reports from abroad wherein possible competition and other matters of vital importance to producers and merchants are given attention, but as British Consular reports seldom bother to refer to useful items, my suggestion is probably a "wish as father to the thought." Perhaps translations from foreign reports from both British and foreign markets might be more useful.

The Forest and Geological Department records are the only publication that I know much about which are of real value, but both Departments are expected to do too much; men and money are needed in both cases.

The attention of the public consumer could well be drawn to the more economical use of fuel, pointing out that although we have an abundance of cheap fuel to-day, present methods if not quickly altered will cause our successors to curse us for our improvidence. There are probably many other similar problems which would lead to increased efficiency and improvement and a reduction of waste.

I believe that the lack of sufficient and efficient transport facilities, particularly in the matter of railways, has done more in the past to cripple the development of the country than anything I can think of. Railways.

I would emphasize the necessity for the public being taken more systematically into the councils of Government with regard to the general policy of railway communication. In ordinary circumstances such a suggestion might be deemed to be a mere impertinence, but the peculiar conditions under which the country is governed make it, I submit, legitimate for the public claim to be admitted to the confidence of Government in this great question. For Government as the great railway owners, the greatest landholders, and the principal agriculturalists and industrialists, are the predominant partners with the public in the joint enterprise of furthering the material prosperity in this Empire. Unless, therefore, Government affords its confidence to those who are working with it to this end, the rate of progress cannot be either steady or harmonious, and I maintain it is not only useless, but mischievous, to permit the public to continue to invest money with the result that the latter are fruitlessly endeavouring to develop the country and to distribute its products in the markets of the world, at a more rapid rate of progress than Government can proceed with its share of the work. If financial and other considerations prohibit an advance, it would surely be better that both Government and the commercial community should mutually agree to mark time rather than to attempt one to outstrip the other. I respectfully suggest that a Committee, which might be permanent, be appointed to enquire into the whole question with its varying aspects, and meet regularly at central points to deal with the multifarious questions which are constantly cropping up, which dovetail and intermingle, and affect each other, but which are now considered in detail and separately without a complete knowledge of the whole of the considerations involved.

Many years ago, in the report of the Mackay Commission, a report which was certainly framed in Whitehall, but wherein a fair and impartial attempt was made to define and decide the necessities of railway development in India, it was recommended as urgently and imperatively necessary that a regular yearly expenditure of about 12 million pounds sterling should be made on railway construction and development, and when one realizes that ever since that report was published no attempt has ever been made to realize that figure, the lack of development we are often accused of can be understood. In fact the Finance Department of Government has wilfully refused to consider or act upon that report. The late Finance Minister, indeed, went so far as to say that he was by no means convinced that there was much room for expansion of the railways of India. One has but to look back on the recent expansion which has taken place in spite of disabilities but which Government refused time after time to acknowledge as within the bounds of possibility only a few years previously. We have "slithered" along always behind instead of ahead of requirements. Railways or lack of them have in the memory of all existing commercial men been a stumbling block to improvement, efficiency, and method. One crisis and public clamour have been succeeded by some slight improvements but never have the complete needs of industry been met, and I hold

that until this fact is appreciated thoroughly it is useless to have Commissions of this sort or to formulate expensive ideas for education or anything else.

Railways policy has for years past been entirely under the control of the Finance Member and railway revenue has been the milch cow for every scheme of sentimental reform whilst the material needs of the masses of people have been left to take care of themselves. The excuse has been that Government are unable to obtain the money for railway purposes. My answer to that is that Government owns a monopoly in the railways and they are run as such, that practically any rate of freight can be charged and consequently we can afford to pay the market price for money, the revenue being adjusted to meet any interest and sinking fund charges. This however has never been the policy and until it is altered I fear any results from this Commission are bound to be rendered nugatory. During a busy grain season every wayside station is blocked with grain waiting for wagons, lying piled on the roads outside only to get damaged by the weather. What can be the only result from such a state of affairs? The local merchant, unable to despatch, is unable to purchase and the cultivator held up with large stocks is obliged to accept lower rates or he may see his stock destroyed as it often has been. Would it be possible to estimate the crores of rupees which have been lost in this way year after year? All this is done whilst, on the strength of a good budget, the salt tax is reduced by 8 annas a maund, a boom which goes straight into the middleman's pocket. Has it ever occurred to Government to ask the millions of peasants whether they would prefer to have the salt tax reduced or that their grain should be promptly removed and cash paid for it? The ryot's answer at any rate would be "let me have my money for my grain for I have never heard of the salt tax." It is sometimes remarked that every railway in India could not be expected to maintain sufficient rolling stock to deal with any possible maximum of traffic and it is obvious there might be wastage at times in such a case, so I would suggest that a Central State Wagon Company or Department be formed (Government owned if necessary) which would hold a sufficient number of wagons available to turn the scale at any period or point of shortage, which could be sent in any specific direction; for it is seldom that the entire community is affected at one and the same time, but it generally is in one quarter or other. It is naturally useless to consider rolling stock only, increased track, siding, stabling, and repairing facilities must of necessity follow in regular order and stand on exactly the same plane. I have only referred to wagons for the sake of brevity. I would further suggest that for the purpose of providing funds, Railway Bonds might be issued carrying the Government's guarantee of interest at the market rate, or better still a generous share of the profits over and above that figure in the case of Premium Railway Bonds carrying a definite fixed rate of interest high enough to attract investors, or, to go further and try Premium Lottery Bonds, which only a thinskinnyed hypocrisy prevents us using everywhere. It would at least possess the benefit of controlled speculation in comparison with the present wild gamble which takes place in every bazar in India on the merest rumour.

As with railways, so in a lesser degree with waterways. Why waste good money on railways when water transport is at hand. Waterways in India can be developed to a wide extent, particularly in the regions of Eastern Bengal and Assam where the development of the country, as regards agricultural, mineral and forest produce, is at present seriously hindered.

ORAL EVIDENCE, 17TH JANUARY 1917.

NOTE.—I have not qualified the three or four paragraphs which are referred to in the oral evidence, as I think it will be clearer hereafter if my oral evidence draws attention to the original paragraphs in the written evidence in preference to corrected paragraphs which might otherwise bring about misunderstanding.

W. A. IRONSIDE.

President.—Q. In your written evidence under the heading 'Technical aid,' you say "Consequently, for the present, I am inclined to depend on the established laboratories in Europe for research." When you say "for the present," I should like to know what your views are with reference to the desirability of developing in this country, as soon as possible, the means for research on the raw materials, that is to say, whether you think that it is better that we should develop our means in this country, or whether we should continue to rely on the laboratories in Europe for research?—A. As regards raw material, I am in favour of the present means at our disposal being expanded to enable us to gain a better insight into the value of the raw materials. But I was thinking more of methods of manufacture after the raw material was handled.

Q. There is probably much room for difference of opinion in the matter of raw material, especially on the question of vegetable material. The plant varies in its quality and producing properties at different stages of its growth, and consequently, if you do not undertake research here, you will never be able to get your raw materials tested properly, because there are many conditions, such as soil and climate, to be taken into consideration?—A. I was not thinking of pure and simple analytical work. I was thinking of manufacturing on a large scale.

Q. Even on a manufacturing scale, do you think we shall gain much by having experimental tests made at home rather than in this country?—A. Not experimental tests.

Q. Then what you might call manufacturing tests?—A. What I feel is we have got such a small staff and such small opportunity for methodically and quietly testing. You cannot expect this country to run specialists in each separate department of industry.

Q. Can you give us an example of something which will enable us to understand what you have in mind?—A. For instance, coal distillation covers an enormously wide field, and that has to be specialised work. At the present time my own firm are starting a laboratory of their own in the office and it is naturally impossible to find a man who can give us really valuable opinion on everything. I am thinking of work like coal distillation. It is impossible to expect a man to know everything in science. We are apt to load men in India with too many things. We expect him to do everything.

Q. Is the outlook in that case sufficient to warrant Government having a staff and plant big enough to carry on experiments like testing with regard to the quality of coke, quantity of tar, the quantity of bye-products other than tar, and even following further and determining the qualities of the tar for the purpose of getting from it some of many derivatives that can be obtained. In the case of coal, keeping that in mind, do you think it would be worthwhile—do you think it would pay the Government and therefore the country—to establish an installation and a staff for the purpose?—A. I believe this is one of the most necessary opportunities, I might say, for real examination and assistance by Government. Low temperature coal distillation provides for India an industry, the development of which has possibilities of a far-reaching character and immense value to the country, and would, I believe, repay the closest and most methodical examination and assistance by Government. We have many seams of low grade coal practically all of them containing valuable volatile products and the process of low temperature distillation is being rapidly perfected. When I was at home last, I saw a distinct advance on anything I had seen two years ago, and the suggestion is now, I believe, far enough advanced for a deliberate effort being made to tackle the question here in India. The need of a cheap smokeless fuel to take the place of wood and dung fuel needs no recapitulation and the demand is enormous for that fuel. Its effects on agriculture might be marvellously valuable. Similarly for the bye-products. Although there might be some difficulty in using the surplus gas economically, we may yet see coal distillation plants in close proximity to large manufacturing centres which, instead of sending, as they do at present, 90 per cent of the value of fuel up the chimney, will first turn the coal into smokeless fuel and bye-products, using the gas only for driving their plant, either by means of gas engines or gas fired boilers. That holds to my mind a most valuable future for industry of all descriptions, and I think it would well repay Government to spend a lot of money on it. But it is no use asking a man to come out on Rs. 500 a month with a miserable little laboratory. The thing is worth millions and therefore we can afford to pay many thousands for it.

Q. The apparent direct advantage to Government from a work of that kind from a financial point of view is *nil*. The Government have no direct interest at present in the mineral rights of the areas occupied by most of our coal fields, but, putting aside the question of public duty, the matter of ways and means must be dealt with. Do you think that the coal owners—I do not mean the colliery owners but the owners of mineral rights—might fairly be asked, or if necessary, be forced to assist for the purpose of covering the expenses of this work?—A. I think so. I think also the agricultural possibilities to the country are enormous. We can save dung for manure. The whole thing requires a vast organisation; it is not only the mere matter of a chemical laboratory that has to be tackled.

Q. The problem is obviously beyond the capacity of any one company. It is not fair to expect any company to do that; they would not be able to have anything like a monopoly?—A. We must not have a monopoly. It is too valuable to the community to have any monopoly.

Q. Do you think that this matter has had a set back in England purely on account of this financial problem?—A. Very largely. I think they tried to promise too much and they had not spent enough time in research work; but the financial problem is undoubtedly one of the chief things and unless you can keep up the public interest and good-will you cannot carry it on.

Q. With reference to the formation of what you describe as the Mines Department, presumably, you would link together in that department the Geological Survey and the present Inspector of Mines; and, in addition to that, you would extend the personnel of the department by giving it further powers—definite executive and administrative powers—which would require also the assistance of advisers?—A. I think every Government official in this country is overworked. The Geological Survey wants about four times as many men as they have at present. The Inspector of Mines wants at least three times as many men to do the work efficiently as he has at present. The value to the country of coal—I am speaking of coal because I am mainly interested in that—is so great that the present methods which are slipshod must cease. There is no use of talking of expansion of iron and steel unless we can maintain that iron and steel with cheap coal. I have set out as carefully as I could—but I am subject to correction and alteration—the present trouble that we have with regard to coal titles, and a charge of four annas a ton would be cheap at the price. The same department should be able to force people to work collieries properly. At the present time, the mine owner or the company spends a lot of money on deep workings when he finds himself flooded out by some cheap and nasty method employed by a neighbour. We want to try and co-ordinate the whole system of mining, and I should like to see its real value to the country recognised in a different manner from what it is at present. It is left to take care of itself.

Q. Four annas a ton will amount to forty lakhs on sixteen millions of output?—A. Yes. It would be cheap to the coal industry at that price.

Q. From my imperfect knowledge of the country, to my mind it is difficult, almost impossible, for any Imperial department to be able to grant a mining lease in any part of the country with safety, because local rights, as you point out in your note, vary from place to place to such an extent, not only vary in character but also in the degree of doubt as to real ownership, that a mining lease under present conditions cannot be granted except by Local Governments after very elaborate local enquiry. That, I take it, is your view?—A. Yes.

Q. But you have made a proposal of a practical kind which I do not think I have seen before, that we should organise this Department of Mines with a Mines Commissioner. May I say Mineral Settlement Officer?—A. That is the sort of thing that we want.

Q. Local investigation as to mineral rights? I suppose you would start by issuing a notice to every claimant of mineral rights within his district, by publication in the gazette or otherwise, that the case will be heard from a certain day onwards and claims should be lodged. These claims should be settled district by district?—A. Yes.

Q. It becomes a sort of local mineral survey?—A. Yes.

Q. These mineral rights when once established in the Court of the Mineral Settlement Officer will be published and mapped, and from that time no disputes of the kind will be possible?—Quite so. It should be possible for a colliery proprietor, who is prepared to spend money on a property, to get titles settled once and for all. I have a case in point. We have spent about twenty lakhs on a colliery and had been in possession for eleven years and 364 days. We were sub-lessees but were served with a notice an hour before the expiry of the 365th day of the 12th year after the date of the original lease on the ground that the original lease had been obtained from the man whilst drunk, and consequently they sought to oust us from possession. To defend that action cost us something like four lakhs and we found that our own legal adviser was advancing money to the other side to carry on the litigation.

Q. The settlement system would require legislative sanction, and the legislation would take such a form that, for instance, if A and B had rights over certain land, both A and B would get due notice that the case was going to be heard by the Mineral Settlement Commissioner and that his decision would be final?—A. That is so. I do not want to do anybody out of their rights. But when you take a lease in good faith and spend money, when once the colliery is started and the work is done, whatever difference there may be in relation to original ownership, let them settle their differences without dragging in the colliery people, who have at present not only to develop the colliery but to defend their title and the lessor's title as well. Some collieries have spent more money on legal costs than they have on machinery.

Q. Hon'ble Sir R. N. Mookerjee.—Up to the High Court the decision was in favour of the collieries company, but the Privy Council said it was all wrong?—A. That had not anything to do with the Privy Council. It was a case of the man who had given the lease to a lessee and who after 11 years and 364 days put in a claim saying that the original lease had been obtained by fraud.

Q. Sir F. H. Stewart.—Is it the idea that there should be a local investigation and adjustment of claims and publication by the Local Government and then it should be handed over to the Imperial Government?—A. I have only put forward my suggestion in the abstract form. It is a matter for legislation and very careful examination. The exact methods to be employed are rather difficult because what may be necessary in one province may not be so in another or to the same extent. But I do think that, when the royalty owner and the lessee have come to terms and the ownership of the royalty has been proved and registered, after an interval of twelve months, which is given for anybody to appeal against that registration, it ought to hold good afterwards in case of any second claim cropping up.

Q. Mr. A. Chatterton.—Did these difficulties greatly interfere with prospecting?—A. Yes. It starts almost at once. We are very lucky if we get our prospecting done without some trouble.

Q. Mr. C. E. Low.—Do you know of cases where property has not been exploited on account of this difficulty?—A. I know many of them. I can look up the record and provide a dozen cases.

Q. And in spite of this, it has been exploited?—A. The properties I am thinking of were properties which we relinquished because of the trouble after we had spent money on them.

Q. The destruction of capital by reason of legal proceedings is almost as great as by the navy and army?—A. Yes. We keep the mcfussil courts going on questions of title.

Q. Hon'ble Sir R. N. Mookerjee.—There are firms who, knowing the defect in title, take certain properties. Do you say that they should be absolved of all liabilities because they have taken them up? Some of these questions ought to be seriously discussed?—A. By getting a proper title we should be quite prepared to pay more.

Q. You say in section (f) "Provision should be made for the preservation and protection of the title of persons who have already sunk capital in developing any mines or minerals." Supposing you, in ignorance, sink capital in a certain thing which you should not have done, do you claim that provision should be made to safeguard your interest?—A. I do not wish to speak entirely from the colliery proprietor's point of view. I want to safeguard all interests. At the present time money is wasted on all sides. It does no good to anybody. By means

of this suggested Commissioner, the royalty owner would be just as able to safeguard his title as the colliery proprietor.

Q. This would take effect after the settlement has been made?—*A.* No.

Q. It does not protect the present owners?—*A.* What I feel about it is this. We want to settle the whole of the difficulties at the present time by suggestion (*f*), which is that before people have sunk capital in developing mines provision should be made for securing them a clear title.

Q. How?—*A.* Through this Commissioner enquiring into the different claimants' rights. Take the subject of one of our own collieries where we are still litigating on the subject of title after 15 years.

Q. You must not take a firm like Messrs. Bird and Company, but take those who knowingly sink capital, taking advantage of this section?—*A.* I think that can be settled by the Commissioner direct; and probably the colliery proprietor, who has acted as you suggest, may be made to pay the cost of getting a proper title. But I am thinking not only of titles but the question of working the collieries properly.

Q. President.—Would it spoil your scheme if section (*f*) were modified?—*A.* In some modified form, you would find section (*f*) would work very well.

Q. It looks like providing a sinking fund to cover speculation?—*A.* I have no intention to do that.

Q. You do not look upon section (*f*) as vital? If it were dropped out the whole scheme would still be worth considering?—*A.* Yes. My suggestion is not to assist anybody who takes a speculative risk. These are only abstract ideas, and when they come to be elaborated in the shape of legislation, all safeguards could be taken.

Q. I am only trying to find out which of these proposals, if dropped, would practically have no effect on the principle of your scheme?—*A.* I am quite prepared to eliminate section (*f*) altogether.

Hon'ble Sir R. N. Mookerjee.—*Q.* You say in section (*d*), "Minerals and mineral rights in respect of which no claims shall be filed within the prescribed time must be declared to belong to Government." There may be an old widow without any education who may be the owner of such rights, and suppose she does not register her rights within 12 months or 15 months—she may be living in a village and may not know the world outside—will your proposal work fairly and equitably in that case? Bring your mind into India and into the Indian conditions.—*A.* The Commissioner's duty is to find out the widow and examine the claim.

President.—*Q.* When rights change it will be the duty of Government to give due notice to every owner of rights to lodge a claim within a prescribed period?—*A.* Give 12 years if necessary. We get our results eventually at the present time through litigation and uselessly spending money. I want to try and get them without this waste of money.

Sir F. H. Stewart.—*Q.* You say in section (*h*), "Provision should be made for the compulsory acquisition of surface lands required for mining purposes and full power should be conferred on the Mining Commissioner to carry out such acquisition." Who is going to decide?—*A.* In Bihar and Orissa that is already provided for, but has never, I think, actually been put into use. It is provided for in the Chota Nagpur Tenancy Act.

Q. Only in respect of lands in which the Government possess mineral rights?—*A.* No. It is extended to all collieries and railways, but we have no assistance of that sort in Bengal and at the present time we have the greatest difficulty in working the minerals. The law gives us power to obtain minerals from the surface, yet we have not got any power to acquire land to carry this into effect.

Q. Do you refer to the Land Acquisition Act?—*A.* I am thinking of the Chota Nagpur Tenancy Act provisions which enable collieries to acquire land as for a public purpose on the same terms as railways. In Bengal there is nothing. At the present time we sometimes have to lay out our collieries in an expensive way simply because of some surface obstruction. We are quite prepared to pay the market price and wish to treat owners fairly. If the railway has to go across a certain land, that land is acquired and the Government fixes a price for it.

Q. Subject to appeal?—*A.* The price is eventually fixed. At the present time we are sometimes blamed for not laying out our collieries properly. Government and railway collieries may be laid out properly,—they suffer from no such disability,—but we cannot. We have to make the best of a bad job and provide the freight for the railways.

Hon'ble Sir R. N. Mookerjee.—*Q.* There must be an appeal from the Commissioner's decision, otherwise he will not be acceptable?—*A.* I do not want to take advantage of anybody by that suggestion. I think legislation could be brought about, making it perfectly equitable for everybody. At the present time we get through after harassing delay, and endless expenditure though we probably do get a settlement eventually, surely these decisions could be come to without wasting all the money and the interminable time that is at present taken up.

President.—*Q.* I understand that the foundation of your proposal is that the development of the mining industry is as important in the public interests as the development of railways, and power should be acquired, in some way or other, to secure these title rights and simplify

them. You have a fixed belief that what is done on behalf of railways you ought to be able to do on behalf of mines?—A. Yes.

Q. That is really the fundamental principle of your proposal?—A. Yes.

Mr. C. E. Low.—Q. Supposing these rights are of the same importance and there ought to be the same facilities for mineral rights, does it follow that these mineral rights ought to pass through the possession of Government, that is, should the Government acquire them as they do in the case of railways. The actual title does not vest in the railways; the title is still with the Government?—A. I should prefer that.

Q. Section (g).—The register would correspond to the record-of-rights framed by the Revenue Settlement Department?—A. Yes.

Q. Has any record-of-rights been framed in any of the coal districts by the settlement parties?—A. Not yet complete.

Q. You do not know whether the settlement record-of-rights contains any record as to mineral rights, or whether there is any power to make such a record?—A. No.

Q. The general law, so far as I recollect, is that if, a certain entry has been attested before an officer, then the burden of proof lies on the other side to show that it is wrong. In some provinces, not in Bengal I think, it becomes indefeasible after a certain lapse of time?—A. Yes.

Q. Supposing it is impossible for the Government to accept the whole scheme it would be some good if you could have something of the same kind as exists at present, in respect of the record-of-rights for minerals?—A. It will be of very great assistance.

Q. I am assuming that the record-of-rights does not record any mineral rights.—A. It does not record mineral rights. As regards section (j), if the Government took over the minerals and protected all these owners it would more or less meet all cases.

Q. What I say is this, that when land is acquired for a railway that land is not acquired by the railway, but by the Government, and it remains the property of the Government although the railway have every right to use the land. The railway is for public purposes, but this mining is for private interests. There is one important qualification that exists in the case of railways, and that is that Government can refuse to acquire at all for the railway.—A. (No answer).

President.—Q. I should like to know whether the analogy is perfect, because what you call in mineral development the prospecting of coal, the railways call the survey of the land. How far are you going to push this proposal to acquire rights—to the mining stage or the prospecting license stage?—A. I would leave the settlement of terms to the original owner and the colliery or mine workers' own private efforts. When a settlement is effected, they can go to Government and say, 'We have come to terms and we want our terms registered, and will you register it now?' The Government can then take up the case, charging the colliery proprietor for that work, the original owner being assured that his title will be respected. Then the Government could turn round on the colliery proprietor and say, 'We have assisted you to this extent; now we shall see that you work the coal properly.'

Q. Will that be done to the prospecting stage or the mining stage?—A. At the commencement, before anything is done.

Q. Anybody can make his own arrangements?—A. Yes, and then go to Government for confirmation. Part of my proposals already exist in some districts. Government approve and register a Ghatwal's title in the Sonthal Pergunnahs. Until we get registration we are not allowed to do anything. The terms of agreement are settled between the Ghatwal and the buyers when they go to Government for registration. If Government think that they are proper and reasonable terms and the man has been safeguarded, the lease is registered.

Q. Is that registration of any value?—A. Yes. It is of considerable local value for the Ghatwal is not allowed to grant a lease beyond the period of his life unless the Government confirm the lease.

Q. There are cases on record, in my own knowledge of Burma, of owners of oil rights agreeing with the lessee to register on terms many times more than the actual consideration for transfer?—A. Yes.

Q. How is that going to be dealt with?—A. How do you do it in Burma? It does not apparently matter much as long as the terms do not ruin the title.

Q. It will have to be preceded by a Government investigation of rights?—A. Yes.

Q. Otherwise simple registration would be useless?—A. Quite so.

Mr. C. E. Low.—Q. In land acquisition cases the Government pays money into the court?—A. Land acquisition for industrial purposes may be the same as for railways as long as the original owner and the buyer come to terms. They can go with their lease to Government for registration when Government may enquire into the value of the original owner's title. After that, with the Government seal on it, the lease is of considerably more value to the mine owner than any lease at the present time can possibly be.

Q. If there is a dispute the money is paid into court and the parties settle among themselves?—A. Yes.

Hon'ble Sir R. N. Mookerjee.—*Q.* It is not a case of land acquisition where Government pays the money into the bank. Here it will be a case of everlasting royalty, and the Government cannot know how much the royalty will come to in the end?—*A.* If there is once a settlement made of the original purchase price the same will hold good in the case of royalty.

President.—*Q.* No mineral property can be determined in value in the same way as the surface property. Its value for the future is so uncertain that no figure could be put down as a fair and equitable consideration for the transfer?—*A.* (No answer.)

Mr. C. E. Low.—*Q.* Accepting entirely what the President says, you cannot accept as your basis a sum which the apparent owner is willing to accept, because it cannot be at all a fair one and there might be collusion?—*A.* I do not see where the collusion can take place. If an owner of property thinks that there is mineral below the property and he were to put it up for public auction, I step forward and say, "I am prepared to prospect your property and pay a cash sum down for the right of prospecting, and provided I find coal I am prepared to pay so much more down as salami and so much for royalty, and if I do not find coal, or do not think that the coal is worth the price that you fix, I merely lose my prospecting salami and retire."

Q. There may be cases where the sum might be too small and it might lead to collusion on his part?—*A.* There again the Government might step in to see whether the terms were equitable.

Mr. A. Chatterton.—*Q.* Would it be possible to establish a court by which the claimant of mineral rights can establish his claim to these minerals without reference to their value?—*A.* I think that is quite possible as a starting point.

SUBSEQUENT NOTE BY WITNESS.

I enclose for the benefit of the Commission, in case they have not seen the papers before, Blue books issued by His Majesty's Colonial Office in regard to the grant of concessions and Report on legislation governing the alienation of native lands in the Gold Coast Colony and Ashanti. The Rules therein might, with certain modifications, be made applicable in India; it is at any rate the nearest approach I have yet found to my requirements. They have been sent to me through the courtesy of a previously unknown correspondent after he had read the report of my written evidence before the Commission in the newspapers.

President.—*Q.* We have had at different times put before us this statement, that companies owned or managed by English firms sometimes refuse to register the transfer of shares to Indians. They sometimes also refuse to give Indians an opportunity of taking shares. Can you tell me, first of all, whether in any of the companies that you have floated here or managed, there has ever been any objection to inviting Indian subscribers? I take it from the second paragraph of your note that it is not so at present?—*A.* There has never been any such case to my knowledge. I am quite sure it does not exist.

Q. Do you know of any case of managing agents or the Board of Directors refusing to transfer shares to Indian buyers?—*A.* No.

Q. It has never happened?—*A.* No.

Q. Do you think that this practice is in any way prevalent in India?—*A.* I have never heard of it in Calcutta. I do not know what they do elsewhere.

Q. In the case of private companies, of course, it might happen?—*A.* Yes. It might be desirable for them to keep their interests in certain channels, but public companies never follow that practice.

Q. I know of a certain private company objecting to a Scotch subscriber of shares. You do not know of any case to your knowledge in connection with the Calcutta firms?—*A.* No. I have got here a list of all the companies with the names of shareholders, so far as we can get them from the register of shareholders. In our coal companies there are 1,551 Europeans and 405 Indians and 59 Armenians. You can say 1,600 Europeans and 400 Indians registered in coal companies. I should think there must be a much larger number than that, because the Indian buyer likes to hold his share on blank transfer and we have hundreds and hundreds of applications for dividends at the end of each half-year by the holders of shares on blank transfer. In the jute companies there are 2,471 Europeans and 423 Indians.

Q. Are those numbers of shares held or of shareholders?—*A.* Shareholders. In the case of coal companies the Europeans hold 97 lakhs of rupees and the Indians hold eight lakhs. I might say here that the Europeans include Messrs. Bird and Company and as we hold a very large interest in our concerns it makes the average European holding comparatively high. The partners of the firm hold almost two-thirds of the capital in some cases. In the case of jute companies, 148 lakhs of rupees are held by Europeans and 25 lakhs by Indians.

Dr. E. Hopkinson.—*Q.* Would you say that these figures that you have given are fairly typical?—*A.* Yes.

President.—*Q.* So far as your firm goes, there has not been any restriction of any kind as to who should take a share and to whom shares are to be transferred?—*A.* No. I am floating a company next week and I should think that at least one-sixth of the applicants are Indians and I would welcome a greater number.

Q. And so far as your general knowledge goes, you think that is the prevalent practice in Calcutta?—*A.* Yes.

Q. To your knowledge there has been no exception?—*A.* No exception to my knowledge.

Q. When a company is being floated I suppose you sometimes give a tip to your friends to ask whether they would like to come in?—A. We have Indian friends and European friends.

Q. And you do the same thing to your Indian friends?—A. Yes. I have two or three dozen names in my pocket book that always get the same information as the Europeans do.

Q. Have you been the Director of any bank in Calcutta?—A. Recently of the Bank of Bengal.

Q. We have been told that there are difficulties in the case of Indian industrial enterprise in obtaining accommodation from banks—not only difficulty in obtaining accommodation on the security of plant and machinery—but in one case we have been told definitely that there had been difficulty in accommodation being obtained for Indians on the security of stock, presumably saleable stock. Do you know, in the first instance, assuming that to be the case, whether that ever happened because the applicant was an Indian?—A. I have been director of the Bank of Bengal for only about a year but I have never heard of any suggestion of the sort. Each case is considered absolutely on its merits. Enquiries are made and I have seen a number of Europeans refused and probably there have been some Indian applicants refused accommodation. But I have also seen them accepted. In each case there is no question of preferential treatment. I have seen Europeans turned down for just the same reason as Indian applicants.

Q. You think that a statement of that kind is a hasty one?—A. I think that is the case. I do not say that a bank manager does not commit mistakes.

Q. I suppose it is possible that in the case of Europeans applications largely come from firm of standing?—A. Yes.

Q. And thereby your enquiry will be simplified as to the merits of the case?—A. Speaking for ourselves and the Bank of Bengal, we have to put up a second name under the Bank's Charter and naturally if we go to the bank at all with a suggestion, we back it with our own name, but the bank does not accept everything that we put before them simply because our name is on the paper. We try only to go to the bank with proposals which we know that they will accept.

Q. And therefore the percentage of rejection will be very small?—A. Yes.

Dr. E. Hopkinson.—Q. Difficulties may arise in the case of transfers of shares. How do you usually meet them?—A. In matters of transfer we have simply carefully to carry out the law. If it is a case of difficulty as it is sometimes in the case of an Indian transferee, we try to make things as easy as possible. We try to smooth over the difficulties.

Q. You transfer the settlement of the difficulty into the other hand?—A. Sometimes under the law we are forced to do so, but we do not try to do that. In anything that comes before us, as I have said, we try to smooth over the difficulties. Some of the things we are asked to do are obviously impossible, whereby we should make ourselves seriously responsible.

Q. You do not attempt to test the validity?—A. As long as proper proof is brought to us that is all we want. Sometimes we get two claims and then care has to be exercised or we might be accused of taking sides.

Mr. A. Chatterton.—Q. You oppose the idea of Government giving financial aid to industries. We have had before us the evidence of a great many witnesses that Indian capitalists are shy and it would give a great deal of encouragement to Indian investors if the Government subscribed a portion of the capital to show their confidence in the *bond fides* of the undertakings and in the prospects. Do you think that it would be an objectionable procedure to advocate?—A. I think we should look round and see what has already been done without Government aid. A number of people would rather rush at Government for assistance simply because they had failed themselves. The Government is expected to do everything sometimes and that cannot go on indefinitely. It might be necessary in the case of a brand new industry to get a certain amount of assistance, but personally I should think that, provided people are able to show definite results or estimated results, they can get their capital.

Q. This would not be the permanent policy of the Government so much, but only temporarily for a few years in order to lead the people of the country to invest their capital in industrial enterprises?—A. I have said, "Many people, however, seemingly prefer to wait until scrip is dealt in on the Stock Exchange, that is, they join in after the scheme has been brought to fruition, or oftener still, they prefer to accept widely speculative rumours in the hope of getting rich quick." Talking of the Indian subscriber, he is likely to wait and see what the scheme is actually capable of doing before taking any risks but I do not think there would be an appreciable increase in Indian subscribers simply because the Government took an interest in it.

Q. In your written evidence you say, "Money grants-in-aid, loans, supply of plant, are mere charities which end nowhere, and carry no incentive." Would you apply that to the development of minor and cottage industries?—A. No. I think that is a question entirely where co-operation comes in. I am talking entirely of major industries.

Q. I assume your remarks throughout are only applicable to major industries?—A. I have very little experience of cottage industries.

President.—Q. You say, "I have little knowledge of village or home industries and I see little value in promoting home industries which must compete on unequal terms with the large factory." You recognise there is a group of industries between the cottage and home

industries and what you would call major industries—a large number of small factories of the kind probably which your firm would not bother about—and they are necessary to fill in the gaps in the economic fabric?—*A.* I quite agree. I viewed that from too materialistic a standpoint and only from one point of view. There are, as you say, what we might call intermediate industries which perhaps need some attention. But I am afraid these intermediate factories are always subject sometime or other to competition from the big factory. The village weaver or the village oil mill cannot turn out the same regular quality or in quantity to meet the public demand. He might meet the demand of his immediate neighbourhood but he cannot compete, no matter how cheaply he values his own labour.

Q. I suppose it is fair to assume that anything like an industrial policy should not only take an account of the profits of larger concerns and the profits of smaller concerns, but also take into account the fact that a large number of people earn their livelihood from home industries. For instance, in the case of cottage weaving, I suppose five to six millions will be engaged and another ten millions dependent on them?—*A.* I should like to see artistic work assisted in every possible way because the old art of India is languishing.

Q. May we take it that you would qualify your statement under “financial aid” to the extent that you will say that some of these intermediate industries may be on their merits worth considering on the score of Government help, and for major factories you would not like Government help in the way of loans. You do not mention concessions of land but improved railway facilities?—*A.* Yes.

Dr. E. Hopkinson.—Q. Do you suggest on economic grounds that it is desirable to encourage the gradual transfer of cotton industry from home to mills?—*A.* No.

Q. You do suggest that in that paragraph?—*A.* I am afraid it is the natural process of evolution though it may not be desirable. I am one who believes in the small industry if it can be kept going.

Q. You would like to make a modification with regard to the cotton industry? Your opinion there is rather a sweeping one—the paragraph beginning with “I have little knowledge of village or home industries”?—*A.* Yes.

Mr. A. Chatterton.—Q. You say that “pioneer factories should only be started if public interest cannot be obtained.” Public interest may be obtained in many cases, but they may require a distinct support from Government—so much Government intervention at the outset that makes it desirable that Government should take up the matter in the first instance and carry out the work. For instance, you would agree in connection with the Forest Department, that it would be desirable that Government should start the distillation of wood or in connection with alkali industry it would be greatly influenced by the policy of the Government. Government might take such industries at first and work them out. The prospects of success under Government management would be much greater, and if such industries are desirable from the national point of view it would be better that Government should take them up and develop them to a certain point rather than they should be left to the chances of private enterprise. The importance of the industry in the first instance is so great that every possible care should be taken to make the pioneer industry successful?—*A.* As far as that is concerned, I think the chances of private enterprise would be just as great as those of Government enterprise. What we want is progress all round, and if the people are taught that they can go to Government for this or that, they will do nothing of their own accord. There has been a great wave of progressive development and keener ideas permeate everybody, and I do not think the same conditions existed 10 or 20 years ago. I think the business people of India are capable of seeing what is a good thing, as fast as anybody else.

President.—Q. My own experience has been that any mineral proposition that we have come across in the Geological Survey, if it proved on superficial investigation to be promising, we have been able to put before the commercial community. Am I suggesting to you too much if I say that, supposing we did reform the Government demonstration machinery to such an extent that we had departments capable of dealing with the scientific and chemical aspects of the problem, these departments would be able to find in the commercial community people always ready to take up projects?—*A.* I think so.

Q. That is the point you want to impress on us, when you think that it could not be better done by Government enterprise?—*A.* I do not think it could be better done. Government would have unlimited funds, and they could go to any degree of capital expenditure that they might deem necessary. Whether they would make a commercial return on capital is quite a different matter; and I think a private promoter would be best able to judge of it from that point of view.

Q. There are exceptions to this, because in the beginning of your evidence you said that in the matter of coal distillation Government should take it up?—*A.* It referred to matters of economic and military value. The economic value of coal distillation to this country is so enormous. It is being recognised in England to-day, but in this country we have not got much coal and we must conserve it in every possible way. Some of it is good, but most of it is very indifferent and we must not go only for the best and leave the indifferent to our successors, say, a hundred years hence. I hold that we must now look at coal distillation as a national matter. It is not merely an industrial question, but a far greater thing, and there are one or two probably other similar instances where I should like to see Government combine with public enterprise.

Q. The Government at home are at present working under war conditions?—A. Yes, and I think they will continue.

Mr. A. Chatterton.—Q. It is not a fact that in the development of many of the new industries the original promoters or pioneers suffer heavily?—A. Yes.

Q. And that acts as a considerable deterrent to people coming forward to deal with new schemes?—A. I think the pioneer is rather apt to be careless. He has got all the ideas and all the imagination and his scheme is probably very sound, but he lacks something of the business brain when starting his work. I saw a big sugar industry started in this country. Three-fourths of a million sterling were spent in trying to bring it to fruition. Within seven days of arrival in this country I represented to directors in London before 150 thousand pounds had been spent that the whole thing was commercially impossible. Had they stopped then and carried out the suggestions that I made, 750,000 pounds would never have been wasted. This mistake has been avoided by successors and they are perfectly successful to-day. Initially they made commercial mistakes. There was nothing wrong with their machinery. I really think that if we are to wait on Government to do everything in the shape of pioneer work there are other things to be done and waiting to be done, and we must educate the people to be more courageous.

Q. Is it not suggested that you should wait for Government to take up a certain pioneer industry, but certain pioneer industries are necessary because commercial enterprise as it at present exists is too slow to take them up. There are certain industries, take, for instance, the alkali industry, which if established in this country might lead to other industries on a very extensive scale?—A. Of course, Government could start as you say the alkali industry, but if the alkali industry shows a fairly certain good return on capital, and demand exists for the products of manufacture, I cannot understand why there should be any difficulty in enlisting the public support that is necessary. Speaking for myself, in my own firm schemes are brought to us and many of them are thoroughly good, and I shall be only too pleased to push them on; but we have not got men at the present time; but later on we hope we shall be more happily situated and may be able to take up some of them. Within the last two weeks there have been two schemes placed before us which are sound commercial concerns, but they would take at least eighteen months to develop even if no war existed. But I am only speaking for myself. There are a lot of other firms besides my own that would be equally capable of tackling any commercial possibilities. On the other side of India we have got only to look at the Tatas.

Q. In your note you refer to the official organisation that is necessary to be created to carry on the industrial development of the country and to deal with industrial and commercial matters. In speaking of the Director of Industries you say "it is a relatively paltry affair at present, but could be and should be made one of the most important posts in each province." I should like to ask you whether you would favour the appointment of a Development Commissioner in each province, controlling not merely what has been brought before us as part of the functions of the Director of Industries, but also dealing with agriculture, trade, forests, fisheries and inspection of factories, and also acting as an adviser to Government in matters relating to railways, harbours and questions of transport generally. Would you like that an officer of this type should be created?—A. Yes; further on I speak of the possibility of a permanent committee on railways. There are so many interests involved in railways that I should like, in each province if necessary, a transport committee to discuss the necessities of the different trades and industries and the requirements of the public, because we do not seem to work on any definite forward policy but work more or less hand-to-mouth. I think a Ministry of Commerce for each province with a far-reaching organisation is vital, the Imperial Commerce and Industry Department being posted with all the results. I think your suggestion is more or less what I had in view.

Q. Do you think that the appointment of a Director of Industries, such as you find in the United Provinces, Madras and the Central Provinces, is not sufficient?—A. They do not go far enough. I think they are very important, but I think they can go very much further.

Q. The question has been raised whether industrial schools should be placed under these officers and also whether higher technical education should come under them. These are comparatively minor matters, in your view, in comparison with the larger functions which you would like them to deal with?—A. Yes. I have not sufficient experience of the working of the Government departments to try and make too strong a recommendation on the subject of education. Education up to a certain point naturally is a departmental concern. When it comes to technology you are approaching commerce and industry in different ways. To ask one department to deal with one system of education and a different department to deal with the finishing schemes as it were means, I am afraid, dual control and might lead to a state of chaos.

Q. There is another point that has been raised in this connection, and that is whether a Director of Industries should be assisted either by an Advisory Council or put under the control of a Board of Industries. I should like to know what your views are on the point?—A. The system of co-operation in the working of the department, in other words, —I presume you mean to bring outside opinion to bear?

Q. Do you think that an honorary Board of that kind would be of real assistance in pushing forward the development of industrial matters in the presidency?—A. I do not think so.

I think that the Government can always call for necessary advice from industrial people without making any permanent honorary Board.

Q. Do you think it would be any advantage if the Board was not honorary, but one like the Harbour Trust Board, etc.?—*A.* I do not see any benefit therefrom.

Q. You prefer to leave the Director of Industries unfettered?—*A.* Yes. I think the less brake power you put on a man of that description the better. Let him use his imagination and then of course you will have certain control by Government, and if Government want advice on certain proposals, it will always be got by merely asking for it.

Q. Do you think that if the Director of Industries is so appointed, he would be sufficiently in touch with the requirements of the commercial and industrial world?—*A.* I think so. If the Ministry of Commerce and Industry is properly constituted, the whole working together might provide all that is necessary.

Q. You have not considered the question of the development of these minor industries, but you state that the Presidency Banks might take a greater share in the coming industrial expansion of the country, and you say that their Charters might be altered so as to allow them to undertake more business?—*A.* Yes. At the present time they are forced under the Charter to take certain forms of security, and also, a second security or name. At times that might be unnecessary. A separate department of the bank might be formed to deal with industrial matters and to keep the bank informed of the value of progress in industrial affairs. The bank is at present limited entirely to the promoter who states his case but the bank has little or no means of verifying it beyond the credit of the man that brings the proposal.

Q. Would you advocate the extension of their powers of doing business?—*A.* With due safeguards.

Q. What sort of safeguards would you consider necessary? A competent board of industrially and technically qualified men to advise on some of these points?—*A.* The banks always labour under a disadvantage in that they have not got their own technical experience and knowledge to advise on the technical value and possibilities. For instance, we might lend money against a mill which may be constructed wrongly, or it may have machinery which is entirely unsuited to the trade. They have to ask for a second security in every case now. I fancy this could be done without if the bank knew what the original security was really worth.

Q. Would you allow the Presidency Banks to have access to the London money market?—I think they could get in this country all the money they want. I do not think that you need go to London for capital.

Q. You state lower down that instances have come to your notice of Government competition with private enterprise which have caused bitter resentment. Can you give us confidentially or otherwise any examples of this? I presume you are not speaking of jail competition?—*A.* No. We have started building and have spent about a quarter of a million sterling on a coke oven and bye-product plant in connection with our collieries, using the waste gases for generating electric power. We are going to sell our coke in the open market and it is a distinct risk that we are taking. We have no railway facilities that can be depended upon, but in order to be progressive and to make the most of our material we have taken this step. We had not been started more than a month when we found the East Indian Railway selling their coke in the open market at considerably below current prices. The East Indian Railway have a large output of dust coal from their collieries and it was up to them when they started these collieries to provide ways and means of disposing of their dust coal within their own boundary and not come into the open market and sell coke in competition with people who provide their own funds to construct their plant. That is one of the most serious points. I discussed the matter at the India Office when I was there last year and they were forced to admit that I had a case. We are putting up an expensive plant and in order to show a return on the capital we have got to get a certain price for our coke. I do not know what the East Indian Railway are doing to-day, but they were recently selling coke at a price which was below ours.

Q. You do not want any competition?—*A.* Not from Government concerns, especially from the railways who get all their money from the public who are providing them with the traffic.

Q. Do you know the quantity of coke they were offering?—*A.* I think they were offering 2,000 or 3,000 tons a month on the market. I am speaking of coke. Naturally when they ask us to proceed with the progressive development of our collieries, which has been thrown in our face for a good many years, this sort of thing is a serious disability and it would break the hearts of most people. In the same way our collieries were blamed because we did not put up screening plant and modern methods of loading. My firm has spent something like Rs. 1,00,000 on that form of plant and we might as well have thrown the money into the sea. We have to wait for waggons. The railway and Government collieries do not wait for waggons.

Q. They have preference?—*A.* They have their own railway.

President.—Q. They do not sell their coal?—*A.* They are selling dust coal.

Q. They do not sell their coal in the big market?—*A.* No.

Q. They produce automatically a small amount of small coal. How would you make them dispose of it?—*A.* When they went in for collieries, their collieries were there for the purpose

of supplying the railways. When we start a coke oven plant we have got to find markets for everything, not only for coke, but bye-products and everything else. When the railways started it was on the definite assurance that it was for railway purposes; they ought to have provided for the whole output.

Q. They are pioneers in the matter of bye-products?—A. Had the colliery proprietor not been fighting over the waggon question for the last twenty years the question of progressive development would have been easy.

Q. As regards the question of small coal, could they dispose of their thirty thousand or forty thousand tons of small coal within the railway administration?—A. They have got the railway workshops.

Q. You think they are actually cutting the prices in the open market?—A. Yes.

Q. You do not object if they do not cut the price?—A. If they come to the open market and reduce the demand they are bound to cut the price.

Q. They must dispose of their coal economically in some way. How can they dispose of that coal without being unfair to the rest of you?—A. They could have experimented with soft coke which, I think, could be utilised to a far greater extent, in short utilized these organizations to carry out experiments. They have gone in for the bye-product coke oven, but I think they might have gone a bit further. They are working with the public money when they start all these collieries.

Q. I should like to know how they can go on to the market without cutting the price against you? The stuff must be disposed of?—A. I think they could have made a much greater use of the stuff in their own concerns. I think they ought to make coke for their own requirements, but I understand that it is not being used by their workshops.

Q. If it is not used but if they want coke, they should buy coke from outside?—A. To come into the open market is a totally unfair form of competition. We have to get rid of our dust as best we can,—it would cost them a little more to briquette it. They have got bye-products ovens erected with public money to keep them going. The point is this. We are blamed for not being progressive, and what chance is there of our being progressive? It is a serious matter to firms like ourselves, for we are interested in the railway question too to a degree which does not strike some people. We give the railways over two million tons of freight each year.

Q. How many ton miles?—A. I do not know. It cannot be less than a 150-mile lead. The tonnage handled is largely jute, coal and stone.

Q. You know their bye-product system has enabled them to reduce the cost of their coal from Rs. 1-15-0 to Rs. 1-11-0 a ton, and that four annas has gone into the railway revenue and if the railway is administered properly it will reflect afterwards to the benefit of the people in reduced rates?—A. We have had railway rates increased just recently.

The Commission adjourned at this point and resumed after an interval.

President.—Q. About this question of purchase of coal on behalf of railway companies you don't state clearly what the figure of 60 per cent. represents?—A. It should be fifty per cent. and not sixty per cent. That alteration has to be made.

Q. Fifty per cent. of what?—A. Of the total output.

Q. It cannot be fifty per cent. because the railways in India do not consume more than 30 per cent. of the total output of India?—A. But you must also add the Ceylon and Royal Indian Marine, the firm of Mackinnon Mackenzie, the British India Steam Navigation Company and two or three private consumers in Colombo.

Q. Is that only under war conditions?—A. No. I do not think so.

Q. In pre-war times the Mining Engineer of the Railway Board did not buy for Mackinnon Mackenzie?—A. Yes, he has done so, and gets something per ton. I do not know what it amounts to. It gives him a tremendous control. He knows what the consumption is. It gives him a tremendous handle.

Q. In pre-war times it was purchased on behalf of what?—A. The British India Steam Navigation Company. There are several private consumers besides. I think the fault does not lie so much with the system. The original system, I think, was sound. I was one of the first to whom the suggestion was made. I fell in with it when it started. I think the system was businesslike but the fault is that it was overdone. It went too far.

Q. You think there should have been some check?—A. The idea was sound. But Government, in trying to buy their coal cheaply for the railways, have carried the thing too far and consequently I am sure that it has restricted development work, particularly in the small collieries the proprietors of which see Government buying a restricted quantity of coal, for after the railway requirements are satisfied he has to depend on the public consumer. Being a small man he has not the power to organise, to go round and sell his coal and find markets for it. He therefore shuts down. That was a great mistake in my opinion and will affect the output. I think the present position is largely due to the fact that the Government tries to cut their coal purchase too fine in quantity and price.

Q. What proposal would you make to meet that difficulty?—A. I would leave it entirely to the State railway requirements and leave the other railways to purchase their requirements separately, and let private consumers who want to make use of assistance of that sort pay for it outside. I dare say there are people in Calcutta who are quite prepared to carry out the duties and I do not think that public money should be used for the purpose.

Q. You would limit them to the three State railways?—A. Yes.

Q. In regard to the other railways you say that they should have their own buyer?—A. Let them combine too if they like, or have their own buyers. That would certainly be an advantage. I think there should be competition in the selling of coal. In fairness to the purchaser there ought to be competition. Otherwise consumers would have to combine. I speak as a consumer using 200,000 tons yearly.

Q. Does the Mining Engineer buy for the Oudh and Rohilkhand Railway?—A. He buys for all railways. And the East Indian Railway are also working in combination. I do not know what exactly their arrangements are. Sometimes he is buying and sometimes not buying.

Q. Are you sure about the 50 per cent.?—A. That is what it works out to.

Q. My information is that 30 per cent. of the output goes to all the railways altogether?—A. Yes.

Q. And among the railways you say that the East Indian and the Bengal Nagpur Railways are not included?—A. The East Indian Railway raises a good deal of their own consumption. When you consider the present war requirements it is very great and has brought about a new position. I think it would naturally be restricted after the war. I think that the idea by itself is perfectly sound, but the policy has been overdone.

Q. It has developed into a monopoly?—A. A firm control especially when you consider the proportion of the total output of what is first class coal. Out of the fifteen million tons raised there is but a small proportion that can be considered first class coal and as the railways practically limit themselves to that quality it means that there is a considerable leverage in favour of Government.

Q. You mean by the 50 per cent. under war conditions?—A. Naturally.

Q. Even in peace times, that is in pre-war times, the control has not been so great as to be a danger to the public?—A. Yes. It is a danger to the public also in a way because free and unrestricted trade is better than anything of this sort.

Q. Would you think it suitable if the Government had a department or an individual with suitable assistance to control the quality of coal and not to make a commercial bargain?—A. I would not object to that. I think Government are at liberty to purchase their coal as well as they can. But I do not think they should make use of the department to assist the railways all round and large private consumers as well.

Q. Then you would be prepared to consider the two propositions, namely,—(1) that you limit the activity of the Mining Engineer of the Railway Board to purchasing of coal on behalf of State railways and (2) that you allow the Mining Engineer to check the quality of coal supply to all or any railways and to have nothing whatever to do with the making of contracts?—A. Yes. I am quite prepared to accept that.

Q. Which of the two propositions do you prefer. Those are the two propositions which naturally arise?—A. I would limit him to the purchase of coal for State railways and I would allow him to inspect the coal for the other railways. I would cut out the private consumer entirely.

Q. I may then take it from you that instead of the present system you are in favour of making the Mining Engineer of the Railway Board responsible for the purchase of coal for the three State railways and that he would also be a court of reference in the matter of quality for any railway or any Government department and also to any private purchaser who may wish a certificate of quality?—A. I think the private consumer may well look after himself.

Mr. A. Chatterton.—Q. In your written evidence you say that "a vigilant watch should be kept for all forms of possible competition by the trade representatives to be attached to British Consulates and that they should speedily warn manufacturers against the risks of unfair commercial methods, alternative cheaper, inferior or superior values, patterns and designs and generally competition from without." In what way would you deal with reports received from these officers. Would it be desirable to institute some system of confidential reports which will not be issued to the public but only to firms and people who are interested in the matter?—A. It will be better if an arrangement of the sort can be made. I think that the information should first be made available to the British commercial firms at any rate.

Q. You would not advocate the publication of a trade journal and inviting all people to read it?—A. Of course it is not every piece of information obtainable in consular reports that is really of much value, but information which would be valuable in connection with any specific trade might be circulated to members of that trade both in Britain and India and also in any other of the dominions first, and steps ought to be taken to help to combat the trouble if any trouble is reported.

Q. How would you propose to work this?—A. Would you make individual firms who wish to get confidential information of this kind pay something like an annual subscription

on the understanding that they do not communicate this information to the public?—*A.* Yes. I think so, and these firms should be British firms entirely.

Dr. E. Hopkinson.—*Q.* Do you agree to this proposition that the exchange banks in particular, and to some extent the Presidency Banks, now provide all the financial assistance necessary both for the export and the import trade of India?—*A.* Yes. They do except in a few instances of little importance, and these are probably due to circumstances beyond their control. So far I think the banks have met all our requirements.

Q. You think they act even more liberally than the British banks?—*A.* I had no experience with the British banks for many years and I have not seen much of the British banks, but only speak from hearsay.

Q. You, as an export and import merchant, have nothing whatever to suggest in regard to the financing of export and import trade?—*A.* The present facilities seem to meet our views except perhaps, just at the present moment due to the war. But that is outside our discussion at present.

Q. We shall now come to the internal industrial trades of India. I think your view is that they are not at present provided for as regards finance?—*A.* It is not so much a matter of capital, but when we want a little extra money for expansion and in that respect the Presidency Banks are perhaps at a disadvantage though probably I have less bother on that score than some of the smaller firms or companies which have no managing agents. We put our assets into the scale when money is wanted.

Q. But the Presidency Banks will not lend money on the security of the plant or building?—*A.* They do, but they require a second signature at all times.

Q. And the exchange banks will not do so?—*A.* Yes, at times.

Q. How far is that ground covered by the Indian banks?—*A.* The Indian banks cover it fairly well, banks like the Allahabad and the Alliance. I have not had a great deal of experience of that sort of assistance. I cannot say I could give really valuable suggestions on the subject.

Q. Have any instances come before you although not personally?—*A.* I cannot think of any at the moment, not where there has been a disability at any rate.

Q. I was told that one bank provided for all the requirements of the tea planters on the security of the crop. Is that confined entirely to the tea crop?—*A.* No. We get advances on the sugar crop also.

President.—*Q.* On your firm's responsibility?—*A.* On the crop and the output.

Q. Is there any collateral security?—*A.* We are sometimes asked to provide our name also.

Dr. E. Hopkinson.—*Q.* It is a very different proposition then?—*A.* Somebody has generally got to give a second name.

Q. I was told it was not the case?—*A.* It probably depends largely on the original security.

Q. The security was only the crop?—*A.* So far as we are concerned we are prepared to give a second security. I have not come across the case that you refer to. We are not interested in tea of course. Take for instance the question of the jute crop when we buy our supplies of jute. I suppose our demands on that crop alone must be at least five or six millions sterling a year. Our name is generally at the back of the whole thing always in the case of the Presidency Banks; as security there is the crop and subject to the debentures the mill.

Sir F. H. Stewart.—*Q.* There are three securities, the mill, the company and yourself?—*A.* The mill subject to debentures.

Q. And then there is the crop?—*A.* In the case of the debentures it happens very often that you cannot give any security beyond the debenture. The bank at least would not take it.

Dr. E. Hopkinson.—*Q.* Any bank will advance on your name and the crop?—*A.* But some banks will advance money on collieries for instance where there is no stock.

Q. And where there is no name?—*A.* Sometimes. I do not say that they have done it always without the name. There is little trouble in getting any necessary advance in reason.

Q. What class of bank will it be?—*A.* The local banks, the country banks chiefly.

Q. Do you mind telling us whether your firm and the companies for which you act as managing agents deal for the most part with one bank?—*A.* We deal with several banks. Our main private account is kept with one bank but several banks keep the separate companies' moneys.

Q. So that the question of loans arises between you and a number of banks?—*A.* Yes.

Q. You seem to have a decided horror of Government advancing money to industries. But do you not think that is an extreme view to take? Do you not think that where an industry is sound and development has been retarded simply for lack of capital then Government might step in and help?—*A.* Well. If there are the disabilities in this country that you speak of Government might step in. But in the case of any ordinary industry I do not see why Government should advance money when private enterprise is sufficiently enterprising to go on with it. If you get Government to help one concern it means that everybody else would want the same thing. It will only end in a series of endless and harassing questions. Suppose a man has a jute proposition. He will expect the same assistance as a man who has already had assistance in coal.

Q. I have in mind two particular instances in which Government has provided the capital required. The first was for the construction of the "Mauritania" and "Lusitania." In this case the vessels would not have been constructed unless the company had had Government assistance?—*A.* That was a question which was of more or less national importance. The British Government of that day wanted the supremacy of the Atlantic to be maintained and they wanted two fast vessels constructed that could hold their own with any foreign vessel. That is scarcely applicable to industries.

Q. Take again the case of the British Dyes, Limited. What have you to say to the assistance given in this case?—*A.* That was a situation engendered by reason of what I consider to be the mistaken policy of the past. In this case the action was vital in the interests of the nation. If the British Government had issued a statement that they were going to protect the British dyer or the British manufacturer from the German dye concerns they would have got the whole of the money without any Government participation at all.

Q. Exactly so. That is the very point which I am trying to get out from you. For reasons either good or bad the Government were not prepared to give any assurance, and so they had to take to the other alternative of providing the capital?—*A.* That is a very expensive way of going about it and not I think the most efficient or cheapest way.

Q. I shall now put to you what is a purely Indian proposition. Assume that sulphate of ammonia is required for Indian agriculture. Might not Government properly provide capital for making this available?—*A.* I have suggested something that would apply to this case this morning in the matter of low temperature distillation.

Q. You agree that Government might properly provide capital.—*A.* Quite so. If public money is not available.

President.—Q. In this connection am I correct in recollecting what I think has been my experience in India. As you said to-day Government departments and the technical departments are not sufficient to meet the many problems that have arisen in the country. Successful business people engaged in one particular line cannot be expected to take up the many little things that ought to be developed; they are too small for them to bother about, because you are making profits on a large scale in big things. What can be done to develop these little things? There are some links among them. You cannot say that they are of national importance. For instance take the question of fertilisers. There are so many little things like that which can be fitted into a big machine and we could not get any firm to take it up, because it is too small. In a case of that kind would not Government be justified in stepping in and fostering the industry?—*A.* That may be said of a few years ago. Now we have grown in years and in wisdom. I do not think any firm will now turn down a proposition of this sort quickly.

Q. In cases where the prize is big you will be prepared to accept a certain number of uncertainties but where obviously the prize is small you would not be so willing?—*A.* I think we also are considerably undermanned. What I have said about the Government departments is more or less applicable to firms. We have often not had the staff to deal with it. Personally I find the same thing in the case of my own firm. We have always tried to go along the line of least resistance and tackle the simple trades which did not want any scientific assistance. I think that some of us have now begun to see the force of this and wakened to the situation. My firm are now trying to equip themselves with five or six geologists and a chemical laboratory, and we shall take the scientific man as well as the commercial man in the office. If we are to go into subjects in which chemical knowledge is required we must provide the staff for the purpose. There are a number of firms in Calcutta now who have seen where possibilities lie and I think there is not now the same difficulty in getting people to take up things as was formerly the case. We are all waking up and people are trying to handle industries which ten years ago none of us would have even dreamt of.

Q. So far I admit your point but I am not convinced at present that things are so rosy as you suggest. I also wish it were possible for some of the firms to go in for scientific and technical assistance in order to cover these small grounds. For instance bye-product recovery is one. I tried to persuade the Calcutta firms to take it up. They all met me with the answer that the capital outlay is fairly big and that the returns are obviously small and that there are uncertainties of which they cannot judge because of the want of technical assistance?—*A.* We are gaining strength and gaining confidence which a few years ago we did not have. People now talk glibly of suggestions. When I first came to Calcutta and when first I saw the Bengal coal-field the suggestion that at once came to my mind was bye-product recovery. We were then short of capital and the public confidence that was necessary. We are only just getting to it now and I think the time is coming all round. We cannot run before we have learnt to walk. By rushing in a lot of Government aided industries it might bring about industrial speculation where every man would imagine himself an industrialist and there would be more harm than good done.

Dr. E. Hopkinson.—Q. You object to Government assistance because of the dual control which it would involve and you later recommend that where Government assistance is given Government should be represented by one or more directors. Do you contemplate dual control?—*A.* In cases where the matter proves to be one of national interest and where Government should rightly take a hand, I simply made the suggestion that there should be some means whereby Government may be represented in the Board.

Q. Supposing Government assistance went much further than you contemplate and that it was given to many nascent industries, I take it that you would consider it necessary that the interests of Government should be adequately protected?—A. Yes.

Q. It is not merely sufficient to have a Government auditor?—A. No.

Q. In the second paragraph you make some allusion to the stock exchange. Do you consider that Indian commercial undertakings suffer a disadvantage from the fact that the so-called stock exchanges in Calcutta and Bombay have not the recognised position and authority which the stock exchanges in the United Kingdom have?—A. I think so. I think they suffer a distinct disability.

Q. Would the business in Calcutta and in Bombay be sufficient to warrant the institution of a stock exchange such as that in London?—A. I think there must be a beginning and certainly I think a strong stock exchange would prevent these extraordinary periods of violent fluctuation and speculation. It is totally wrong to find a jute mill share rising as it has recently risen from 290 to 780 in about ten weeks, the intrinsic position of the industry not having changed an iota in the period.

Q. How is the list of quotations which is published in the daily papers prepared. Where do they come from?—A. I do not know exactly how it is prepared. I am not a member and I have not been in the stock exchange. I have never asked how it is prepared. I understand dealings are registered or reported.

Q. But the stock exchange is merely a voluntary association and nothing more?—A. Yes.

President.—Q. Paper reports vary considerably from day to day?—A. Paper reports are provided by separate brokers and separate brokers have their own lists. Sometimes they may be sent to the papers at 2 o'clock, others at 6, and considerable variations can take place in that time.

Q. Not merely that. At one time you see a long list and at another only a short one. I suppose it is due to variations in the methods of the journalist?—A. I understand the papers get it all from the brokers. There is no official list.

Q. The newspapers obtained their quotations from private firms?—A. Yes. The list usually has their name at the bottom. They generally refuse to give the list to any papers that do not give their names. Good firms, I think, insist on their names being published.

Dr. E. Hopkinson.—Q. Does the broker pay for the list or the newspaper?—A. I am not able to say what the arrangement is between broker and newspaper.

Q. We know that at home a quotation granted to a particular company, although it is no absolute guarantee of financial soundness, is still a guarantee to some extent?—Does anything of that kind obtain in India?—A. No.

Q. Can you suggest any methods by which stock exchanges might be established in this country on the lines of those in England?—A. I think that much could be done, but it is difficult to make useful suggestions towards any improvement; to put the stock exchange on anything like European lines would involve heavy subscriptions which the majority of the brokers who frequent the market here cannot afford to pay. At present transactions which have to be recognised take place regularly outside stock exchange limits. There is no stock exchange stamp or seal.

Q. The smaller people depend on the outside broker?—A. Exactly though there is some limit to trafficking in shares, and I believe the outside broker is not recognised when it comes to a question of dispute between outside or inside. It would be better if there were fewer brokers and one of the great disabilities here is that the broker often trades and speculates on his own account. There is little or no check on him.

President.—Q. Have you got anything to tell us what we can do to remedy this state of things?—A. I think a recommendation from this Commission might be useful. That would draw public attention to the fact.

Dr. E. Hopkinson.—Q. In your note under 'Technical aid' you say, "We scarcely need to talk of extensive research work in India yet, for Britain herself has scarcely more than commenced to give the matter attention. Most of our scientists come out young with only a smattering of training and are grafted and absorbed into a country where the demands on their time and work is so great as to prevent methodical enquiry into the multifarious subjects which they are asked to deal with."—I agree that they come out young but that is not a disadvantage. But I cannot agree that they have only a smattering of training. During the last three months I have met many scientific men of the highest possible attainments?—A. I am speaking of the training of a man who comes out at the age of 23 or 24 to take up the post of an engineer. What breadth of training or experience could he possibly have; yet he is at once expected to carry on important work on which the Government have probably to base the whole of their policy of expenditure. That is where danger comes in. The same man after ten years in the country may alter his views entirely. I do not say that we have not got good men, but they are often overloaded with work.

Q. Is not then the whole point of your note that the amount of research work to be done is so great that the men are so few and that they are overloaded with other work?—A. Yes. I think that when a man comes out here it is impossible to have anything more than a very inadequate training and the experience that the man gets afterwards is all the result of the experience that he gets in the country.

Q. The way you put it here is not quite the same thing. Would you like to alter that?
—A. I can alter that.

Q. Do you not think then that the amount of work to be done in India and the fact that the scientific men are overloaded with work makes the strengthening of the scientific departments of Government, one of the most important matters that the Industrial Commission have to deal with?—*A.* I quite agree. I think that the scientific departments of Government want strengthening badly.

President.—Q. Would you not like to modify the way in which you have put the first sentence of that paragraph. Instead of saying that "we need scarcely talk of extensive research work in India" would you not rather say that we "ought to begin at once extensive research work in India"?—*A.* Well. I think the way in which Dr. Hopkinson has put it certainly forces me to modify my views as I have expressed them. But I may say that I was thinking more or less of higher research and not ordinary laboratory work.

Q. I know of several cases in which the laboratory has gone as far as it ought to go and the subject has dropped because there has been no translation of the result on an industrial scale and there are any number of problems to be solved. We have seen it in the Geological, Agricultural and Forest Departments. We have got laboratory results waiting to be translated into research work on an industrial and commercial scale. It is simply crying out for the next stage?—*A.* That is the practical side of it. I quite agree with you there. I may tell you as regards my own firm that we have so many schemes that if we had only the staff we could float a company every week.

Dr. E. Hopkinson.—Q. You mean that given adequate results and means you would be able to float a company once a week?—*A.* I refer to some of the schemes that are brought to us. I could name half a dozen straight away. They are perfectly sound. But we have not got the men at the present time.

Witness here gave confidential evidence.

Q. In what exactly have the Forest Department given you assistance?—*A.* By pointing out the timbers that they considered most suitable and by supporting our proposals for obtaining the timber on more equitable royalty terms. Previously the royalty rates were so high that it only paid us to take the timber nearest to the lines of communication. By reason of the reduction we hope to go much further afield, we have also a lease for a longest period so we know where we are. Previously leases were short and the royalties were high.

President.—Q. May we take that as an illustration of what the Forest Department can and ought generally to do in a case of this kind and not as a complaint?—*A.* It is not a complaint. Dr. Hopkinson asked me to give particulars of the work that we have started.

Q. This is a good illustration?—*A.* This is a good illustration of the point where the scientific department of Government have brought it to a point where the industrial people are able to pick up the thing and carry on.

Dr. E. Hopkinson.—Q. So you have got from the Forest Department all that you can expect reasonably and the advice has been competent?—*A.* The advice has been competent. I have made certain notes on the subject.

President.—Q. We should like to see them confidentially. We have heard several complaints against the Forest Department and this is a case in which it has been turned to account?—*A.* So far as we are concerned we have, I think, got the assistance that it lies in the power of the department to give.

Dr. E. Hopkinson.—Q. Another point raised in your note is the one relating to the fire-clay works. It is a highly scientific industry and I want to know how you got your scientific advice in the matter?—*A.* The man whom we have employed as manager is a man with a practical knowledge of clay work of all descriptions. He has not got the scientific knowledge and that is what we lack at present, but the scientific man whom we have engaged will start, I hope, at the beginning of next month. We have found our weakness when dealing with the scientific side. So far as purely scientific work is concerned we have to depend on the Alipore Government Research Department or some of the private analytical chemists locally, but they can only give us purely analytical results which is not sufficient. We wish to carry the subject further with our own laboratory.

Q. You say that Government departments often put contractors to unnecessary expenditure in the preparation of costly plans? Have you any cases in mind?—*A.* We had a case last year on the Bombay side. We were approached by the Government to quote for a large ropeway 19 miles long. After considerable trouble we put up a scheme. We then prepared elaborate alternative designs and estimates including cost of working. It took something like three months. And included details of the excavation, repairs, and renewals, running cost, supervision, etc. This started in March 1914. Our man went over to Bombay and stayed three months surveying the line and drawing up the specification. It was duly completed approved, but in the meantime the war had broken out and there was delay in getting it approved. It had to go to one superior officer after another and on to the Finance Department of the Government of Bombay. It came back with a request for cheaper designs, again estimates and specifications were prepared and the business went to and fro until January 1915. After being sanctioned by Bombay it was found that the cost had to be agreed to by the Government of India

who approved but they in turn referred it to the Chief Engineer of the Government of India. Meanwhile the price of material rose and the estimate increased until finally the Government of India in the Finance Department considered that the matter had to go to the Secretary of State. It costs us something like 800 pounds and we have heard nothing more about it from that day to this.

Q. Have you any suggestions to remedy that defect?—A. I think that as the whole of that information will be wanted some day or other, after putting the firm to a fair amount of trouble the Government might at least have paid the out-of-pocket expenses.

President.—Q. Is it your opinion that cases of this kind should be chargeable to public funds?—A. I think the out-of-pocket cost at any rate might have been paid.

Dr. E. Hopkinson.—Q. Apart from that particular aspect of the question I want to ask you whether in your opinion it would be better for Government purchases of plant which must be made in England to be negotiated through the agent or the representative of the British firm here or should they pass from the Government of India through the India Office and either the Stores Department or the Consulting Engineer?—A. That is a very broad question. There are as many cases where the reply would be in the affirmative as the reverse. When at home recently I had an opportunity of visiting the India Office Stores Department and discussed many questions with them. I think that Government might go a long way towards assisting firms in this country to carry stocks of material on behalf of the firms at home. This, I think, would be better than the long tiresome process of purchasing every petty item through the India Office. Local competition would be a check on prices. I think it would pay Government to induce the local firms to carry stocks.

Q. On the assurance that Government would give their orders?—A. Quite so.

Q. Are not agents here much more likely to know the actual requirements of any particular case than can be conveyed to the manufacturer through the Stores Department and the Consulting Engineer?—A. Personally that is my view. That is what naturally strikes me. If the firms had a competent agent here it might be conducive of considerable benefit both to manufacturers and to Government departments.

Q. In the case of your enterprises would you prefer to consult the agent here or would you prefer to correspond direct with the matter?—A. We purchase our electrical machinery from the local representatives of the firms. Had we consulted an engineer in England we would not, I think, have been able to do it so well.

President.—Q. At present the Indian Government is maintaining in England a big staff for the purpose of purchases. It is efficient but it is also expensive. Am I correct in assuming that in your opinion the present order should be reversed, that a Government Stores Department in this country should supersede the Stores Department of the India Office, that India is now in a position with its industrial development and commercial representatives here to be ready to undertake home rule in the matter of purchasing stores?—A. I think the answer is in the affirmative to a large degree. The Stores Department in England should be superseded to the extent that if it is not possible to get the stuff here then they may go home.

Q. It would be a subsidiary agent?—A. Yes.

Q. You speak about your system of apprentices here. I believe that the scheme has just been put in operation and that therefore you cannot speak from experience?—A. I should not like to express an opinion until the next two years.

Q. Do you pay your apprentices any wages?—Rs. 30 a month in the first year.

Q. Have you got the exact terms. We should like to have fuller information on the point?—A. I can send you our rules* for the training of apprentices and the agreement* we give them. We want to evolve a type of man badly required from local supplies.

Q. You then make some remarks about the education that is necessary for any one who is to make his living in industrial undertakings. Your object is to stem the interminable stream of Bengalis in particular who go through the Calcutta University?—A. We have got quite a number of lads in our service. Some of them have been through the University and a lot of them are quite good material but they seem to be more or less thrown away. They have absurd ideas of their own importance and they are quite content with a purely scholastic education without any desire to go further. They take no practical interest in their work. They can scarcely write a legible hand and although we allow no man to leave us except to better his prospects we try to keep them and some have been with us for 30 and 40 years. Yet the present type of man is different from his predecessor.

Q. You mean to say it is difficult to get a good clerk?—A. The workmen are better. The education given seems to be utterly wrong for evolving a man with a capacity for earning his living.

Q. It comes to this that you, as engaged in many different industries and in commercial affairs in Bengal, have no use for the products of the Calcutta University?—A. I think they are absolutely no use.

Q. I hope you will be asked to give evidence before the new Commission. I have only one other question and that is about the system that you mention of enabling the employees to deposit with the company some portion of their wages?—A. We have a provident fund

* Printed after oral evidence.

by which each employé deposits with us 5 per cent. of his salary. The firm then adds an equal amount and adds to that interest at 5 per cent.

Q. On the total amount?—*A.* Yes. They have also the power to deposit money with the firm, depositing their savings at 6 per cent. interest and they can draw the money at any time.

Q. You are speaking only now of the workmen?—*A.* That statement refers to the office as well.

Q. It means a big thing financially?—*A.* I do not know what it amounts to.

Q. Can the full amount be withdrawn?—*A.* Not from the Provident Fund. Until they have worked seven years when they can take their own deposits without interest. From seven to fourteen years they can take their own deposits with interest. Beyond 14 years they get their own deposits and the interest and also the firm's deposits and interest in full. If they leave on account of sickness they get the whole of their deposits and the firm's deposits. I have got the rules* and I shall submit them to the Commission. We hope to start co-operative banks within the next few months in connection with our outside concerns, collieries and works—it already exists in the office.

Hon'ble Sir R. N. Mookerjee.—*Q.* About banking facilities there is a universal impression that Indian traders and the Indian commercial community do not get the same facilities in the banks as the Europeans do. Don't you think that is true. There can be no smoke without fire?—*A.* I do not think it makes much difference. There are a large number of Europeans who by reason of their lack of status have been unable to influence the banks. I do not think that merely because a man meets the bank official in some club or social function he will be able to influence him to give him the necessary advance. I think they examine every proposal absolutely on its merits. Of course there are also certain Indian officers in the banks and they are also called in to pass their opinion on proposals.

Q. I gather from your answers that you stand security and that goes a long way?—*A.* I think it is the case that the bank will not advance money to any person beyond what he is worth. They are always on the look-out and whenever there is anything wrong they step in.

Q. Don't you think that it is due to there being no Indian directors in the banks of Calcutta like Bombay where there are Indian directors on the Bank of Bombay?—*A.* We have got only one bank with directors at all.

Q. Don't you think that there are Indians in Calcutta, who can usefully be directors on the Bank of Bengal?—*A.* Except in one or two cases I do not think there are a great number of Indians in Calcutta that are of the same level as the Indian directors of the Bank of Bombay. Beyond you and a few more I do not think there are any who can be considered on the same level as the Indian directors of the Bank of Bombay.

President.—*Q.* Are there not Indian shareholders in the Bank of Bengal?—*A.* Yes.

Q. Have the Indian shareholders any opportunity of nominating their representative on the Board?—*A.* The directors make their nomination. I wish the Indian shareholders took a little more interest in their holding. During the last two meetings of the Bank of Bengal I do not think a single Indian shareholder has turned up.

Hon'ble Sir R. N. Mookerjee.—*Q.* With reference to financial help you have used very strong language and you are not in favour of any Government assistance. You must remember that this Commission is for the encouragement and development of industries by Indians and not for firms like Messrs. Bird & Co. and Gillanders Arbuthnot & Co. Don't you think that Government help is needed in the early stages for the development of industries by Indians?—*A.* I only put that in because I thought that the financial aspect of the industrial problem was not so important as some of the others. I should have to qualify that remark.

Q. You have personal experience of railways where besides their own directors there is a Government director, and there has been no friction. Are there any dangers to be apprehended from the dual control that you refer to?—*A.* In connection with railways there are such fixed methods of working that it is much more easily kept within rules and regulations. When it comes to the question of industrial working, I think there are so many subjects and there is likely to be a lot of divergent opinions. In the railway working I think it is quite easy. There are set rules and regulations and it is more or less easy to look after it but I cannot say the same thing in the case of industrial working.

Q. Then you refer to the free grants of land. What do you mean by that?—*A.* I think that is necessary in certain industries which are of great benefit to the country.

Q. In countries like Japan and Germany they have had help given to industries from the beginning, and that accounts for their position in the industrial world?—*A.* I have not had any direct experience of it. In Germany I think they assist in the commercial operations right from the beginning to the end.

Q. Why don't you recommend the same thing here?—*A.* The English people have always been against that sort of thing. It seems unfair so far as the rest of the community is concerned.

Sir D. J. Tata.—*Q.* As regards speculation in connection with the promotion of companies, don't you think that all the money you get is due to the people speculating on the

* Not printed.

good name of the promoters?—A. That is quite true. I was only speaking of uncurbed speculation in industries.

Q. Speaking about the official organisation you say that railway matters should be under a Ministry of Commerce. Do you mean that the Railway Board should be abolished?—A. I should like to see the Railway Board abolished because as it is at present constituted it is of no use to anybody.

President.—Q. In the case of railways traversing several provinces how are you going to have railway administration in each province?—A. What I mean is that the Ministry of Commerce and Industry would correlate and co-ordinate the requirements of industry, bring them forward and deliver that in a finished stage at Delhi or Simla. That is what is required in Bengal and Bihar.

Q. Have you any criticisms to offer about railway rates? Do you think any modification is needed?—A. It is a very big problem. I think considerable modification is needed. Take for instance the Kumardhubi Works. We import a lot of material, send it to Kumardhubi and work it up and pass it on to Cawnpore and it is dearer to take the things from Kumardhubi to Cawnpore than from Calcutta to Cawnpore. There are many cases of that sort.

President.—Q. Of course a good deal will depend on the volume of trade. Later on you speak about the Mackay Commission. Do you know how much money has been spent on railways?—A. I cannot tell you off-hand.

Q. I have got some figures. 400 crores have been spent on railways since the beginning, and you will see that in 1912-13 they spent nearly 10 millions sterling. In 1913-14 they spent about 12 millions which is about the figure that you say the Mackay Commission recommended. In 1914-15 they spent 11½ millions and in 1915-16 after the war it was about 5 millions and the budget for 1916-17 is three millions?—A. I am speaking of development work and extension work alone and not repairs and renewals.

Q. We have never reached the extent of 12 million pounds on railway construction and development. What you say is that they have not spent in one year 12 million pounds on railway outlay. That goes under the heading of capital?—A. I know it does. But railway finance is a matter which has upset all calculations. So far as new work is concerned I am convinced that they have not spent 12 millions on the annual capital outlay. Owing to the way in which railway finance is conducted they can show any figures they like. I am speaking on the question of expansion.

Q. Do you mean to say that they should be spent on new lines?—A. There is no use in new lines without having stock to run on them. In one year 1913-14 very serious complaints were made here, and as the result of a meeting in Calcutta we got ten thousand wagons added to the railways of India. If we had not those ten thousand wagons we should have been shut up to-day.

Q. I am not quite clear as to what the 12 millions was intended to be spent on. Does it include new rolling stock and renewals?—A. They were intended for new lines and additions to stock.

Q. You say that these 12 millions, which we did once reach, included renewals?—A. At that time we were absolutely up against the most serious trouble. I think that at the time I was on the Coal Traffic Conference when we had millions of tons of coal lying on the collieries, and as the result of our protest here Government agreed to supply us with 20,000 wagons spread over five years. In three years we got 10 or 11 thousand provided. But for our protests we could not have got anything.

Hon'ble Pandit M. M. Malaviya.—Q. You are aware that the working expenses are not put under the head of 'capital' expenditure and whatever is shown as rolling stock is under the heading of 'development'?—A. 'Rolling stock'—that has been written off?

President.—Q. You say that the Finance Department of Government has wilfully refused to consider and act upon the report of the Mackay Commission. Most certainly that remark is not justified by the facts. If you read the financial statements you will find that every time that report is referred to an endeavour has been made to act up to it?—A. I do not consider that they have studied the requirements of the country sufficiently. I am quite prepared to correct the statement if necessary, but I know the financial statements have been one after the other a considerable disappointment down here.

Sir D. J. Tata.—Q. You said somewhere that Government should take up the construction of wagons?—A. I meant the supply of wagons.

Q. Don't you think that it might be left to private companies?—A. We are always short of wagons somewhere. To-day it may be between Karachi and Lahore. At the present time they are robbing Peter to pay Paul. One day we find North Western wagons are running coal between the collieries and the docks. I was therefore wondering whether a central supply or pooling of wagons could not be arranged.

President.—Q. You mean a reservoir of wagons?—A. Yes. A central office from which wagons can be drawn when needed.

Sir D. J. Tata.—Q. With reference to what you say about the salt tax are you aware that with the lowering of the duty consumption went up by sixty per cent?—A. That is quite true but the reduction is so small that the profit cannot be subdivided to an extent as to give the masses the benefit.

Q. It is not such an unimportant thing as you seem to suggest?—*A.* I would far rather see that the ryot is able to dispose of his grain which is lying now at every station in such large quantities.

Hon'ble Sir Fazulbhoy Currimbhoy.—*Q.* You have said that the Presidency Bank Act should be amended because they now require a collateral security although the first security is quite good?—*A.* I think that the Presidency Bank Act was formulated at a time when that might have been necessary as a safeguard.

Sir F. H. Stewart.—*Q.* Would you be willing to see an extension of the Bank of Bengal? That does not represent the views of the Board?—*A.* I am speaking more as a business man than as a banker.

Hon'ble Sir Fazulbhoy Currimbhoy.—*Q.* With reference to what you say about grants-in-aid don't you think that private capital will not come in unless Government gives some guarantee?—*A.* What I am afraid of is that that sort of thing will go on indefinitely. I think if one concern is helped it will lead to heartburning.

Q. If no such impetus is given the Bengalis will not come in?—*A.* They have got any amount of example before them and why do not they come in?

Q. Don't you think that in the case of the big industries it would be a good thing if Government gave some guarantee? Don't you think that would be much better?—*A.* I think Government guarantee is preferable to Government supplying the capital.

Sir F. H. Stewart.—*Q.* You said that Government would be interfering if it competed with private enterprise. Can you give us any particulars confidentially?—*A.* I have not got very many particulars myself. I cannot think of any at the moment.

Q. With reference to the timber industry and its expansion you gave an example of what might be done. Could you formulate your opinions and give us a note.* We have not so far had any evidence on the timber industry?—*A.* There is one of our men working in the Surma Valley. He knows a good deal about the industry.

President.—*Q.* Would you mind giving us his full name and address?—*A.* He is Mr. James Blair, Surma Valley Saw Mills, Limited, Bhangabazar, Assam.

Sir F. H. Stewart.—*Q.* You say that an Aerial Ropeway Bill was sent to the Government of India and that no action has been taken on the matter. Do you know what the present position is?—*A.* There was a Bill introduced by the Bengal Government and they formed a special committee to consider it and it was completed, and the matter was put up to the Bengal Legislative Council. When the Government of India heard the idea Mr. Clarke who was then the Member for the Commerce and Industry thought that it was very desirable that the Bill should be made an Imperial one seeing that ropeways might cross provincial boundaries. So it was sent up to Delhi and we have heard nothing more about it. When it went up to Delhi it came back to the Chamber for opinions and it went round and the views were all sent back, but I do not know what was done with them.

Sir F. H. Stewart.—*Q.* You are spending a good deal on the supply of labour. One of the witnesses before us the other day said that it was a great drawback that expert advice is not taken as to the form of the housing lines and the provision of adequate sanitary arrangements. Would you consider fair criticism?—*A.* To a certain extent. We have spent more than most people. It seems very difficult to provide just what they all want. They seem to prefer their mud walls and their thatched roof because they are warmer and drier. When you bring thatched roofs into big communities there is the danger of fire and moreover they are comparatively costly. The roofs are constantly blown down. The Bihar and Orissa Government have given their attention to the matter and there is a committee sitting at Dhanbaid before which we are giving evidence. I agree that it is very difficult to meet the views of everybody.

President.—*Q.* Do you think that we should recommend to Government the appointment of some architect or some consulting engineer to look into questions of this sort?—*A.* It is so difficult to meet the views of everybody and it will be very difficult to frame hard-and-fast rules. As a matter of fact we have just engaged a young Bengali engineer. The young man has done a certain amount of work at home and we are trying to find out if we can evolve some kind of safe and reliable building for the mills and the collieries.

Sir F. H. Stewart.—*Q.* With reference to the supply of labour, do you think there is any chance of getting the labour direct instead of through the contractors?—*A.* Personally I prefer that they come direct but I know that it is almost impossible. Especially in the collieries I prefer to try and get the manager to run his own labour. Complaints are made, and time after time we have had to fall back on the contractors. Our neighbours are all working on the contract system and we are more or less forced to do the same. Personally, I am in favour of some system of sirkari work. We do it largely in the docks and in our labour department.

Q. Do you think there is any means of breaking down the present system?—*A.* It is so difficult to break down or to interfere with the present system. We have now two or three men studying the system closely and are trying to evolve some means of doing it.

Q. You are also doing a great deal in the way of improving the conditions of living of the workmen?—*A.* Yes, and at the collieries we have started the system of bonuses. Not

only the managers and the superintendents but the headmen, the sirdars and all the leading men get a bonus at the end of the half-year. I find that it has brought about a better feeling between the manager and the people.

Q. Is it a bonus on the quantity of work?—A. It is an extra cash payment. We provide the whole of the money and it is divided up amongst the staff, including the babus in the office and the sirdars and the mistrees on the recommendation of the manager.

Q. In your note you say that the supply of imported employees will in future be curtailed. Do you mean imported from Europe?—A. Yes.

Q. There is also another aspect and that is, it will be difficult to obtain imported labour from the different provinces of India?—A. I think it will and we are hoping that more and more of the local people will take to industrial work.

Q. What are the prospects of getting industrial labour in Bengal?—A. There are very few of the local men that are keen on their work. The bulk of the labour is imported. The whole of our dock labour comes from such distant places as Bilaspur (in the Central Provinces), the United Provinces, Delhi and the Province of Bihar and Orissa. Purely Bengali labour is very difficult to get.

Q. Is that not necessary in view of the industrial progress in future that we should get men locally?—A. I think that it is one of the needs. If we are going to import the whole of our labour from outside it is going to be a very serious problem.

Q. With reference to what you say about the official organisation, would you develop your ideas a little more fully and let us have a further note?—A. I think we want to know what will suit our requirements.

Q. Would it be desirable to separate the Commerce and Industry Department, if you had your provincial ministries?—A. I think Delhi cannot look after all these things from such a distance.

Q. You want a full staffed department and not merely a Member of Council?—A. Yes. It is too big a work and every year the work is growing more important.

Q. Could you let us have a further note?—A. I have got a note on that already. I think it is rather difficult to expect the present Member of Commerce and Industry to come down here and tackle the mass of questions that arise in Calcutta, in Madras and in Bombay as well. That is more than what one man can possibly do, and we in this province are growing at such a pace industrially and commercially and there are so many vital problems awaiting solution. I think they should be thrashed out first by the provincial minister.

President.—Q. Your proposal would be justified in the case of Madras, Calcutta and Bombay but would you be able to justify it in the case of the other provinces as well?—A. I think the United Provinces might have one. Some of the smaller provinces might have one minister in common.

Hon'ble Pandit M. M. Malaviya.—Q. You have been told that the object of this Commission is to draw out Indian capital and to suggest means as to how that might be done by Government, either by encouraging industries or giving their moral support in favour of industrial development?—A. I should like to be perfectly certain that Indian capital at least on this side wants to be really interested in industries. I do not think that all Indian capital wants to have anything to do with industries at the present time.

Q. Assuming that Indian capital can be induced to come in what measures would you suggest for encouraging industrial enterprises?—A. I cannot think of anything more than example in trying to bring about successful industrial development. Any one who wished to put in his money in industrial enterprises is welcome to-day, and I think that every year we shall find that more and more people will be coming forward. I should like to try the experiment of the combination of both Indian and European capital. Sir Rajendranath Mookerjee is a case in point. There is one Indian gentleman in Calcutta who brought me a scheme which he wants us to take up. We discussed it and eventually have taken it up and are going on the principle of half-and-half. We understand each other perfectly well and we are going, I hope, to bring about a combination. If both Indians and Europeans would throw in their interest together, I think each could be of very great help to the other, and I think we shall gradually find that that will come. That will be one of the most desirable forms of co-operation.

Q. Do you think that in that case Indians should always be allowed to take half of the shares in any concern?—A. I do not think it is possible to make any hard-and-fast rule. The thing must come gradually. When one joins others will easily follow his example and they in turn will recommend the thing to others and it will gradually extend. We might not be able to get 50 per cent. of the shares taken up by the Indians.

Q. In the companies that you have been connected with are there many Indians as managers and directors?—A. There are not a great number of Indians.

Q. Are there many Indians among your supervising staff?—A. At the present time in the collieries and the mill agencies and places of that sort we have got about 23 Indians.

Q. What is the minimum salary?—A. Rs. 150.

Q. And the maximum?—A. It runs up to 350.

Q. How many Europeans on the supervising staff?—A. Including our head office we have got about 260.

Q. Are there any men of the domiciled community?—A. Out of 260 there are about 48 to 50 of the domiciled community.

Q. With regard to the directorship of Presidency Banks and other banks, so far as you are aware, has any effort been made by Government recommending that men should be taken as apprentices?—A. I have been a director of the Bank of Bengal for a year. I would not like to answer that question. I have not studied it.

Q. You have drawn a distinction between "mercantile commerce" and "industrial commerce." Mercantile commerce receives at present the full measure of support from the Presidency and the Exchange Banks in Calcutta. Do these companies extend any help to industrial companies?—A. They do. My business is practically all industrial commerce. We have to depend much on the local banks for assistance.

Q. Do the local banks make any advances on the security of building, stock and plant?—A. The local banks do so with our own name behind it.

Q. How does it fare with those who have not a name?—A. They are generally asked to find a name. Each man gets accommodation according to his business and we must all cut our coat according to our cloth.

Q. Suppose that the Presidency Banks deal only with liquid assets, would you then be in favour of an industrial bank which should advance money on industries on the security of building and plant for long terms?—A. Ordinary banking practice is distinctly averse from long term advances and consequently when you come to a purely banking organisation which is dependent on the repayment of money it might find itself in a position of considerable difficulty at times of stress especially like the present. It is scarcely a bank when it comes to do that kind of business. Where are you going to get your funds from? Unless it is very carefully watched every body will go to it as a sort of milch cow and one of the industrial troubles is that mistakes are often made. It would mean that a great number of people will deliberately start industries with a minimum of capital in the hope that they could go to the industrial bank with some unsafe proposition and try to get the money.

Q. Have you given any attention to the system of industrial banks in Japan?—A. No.

Q. In England there is no such system of industrial banks?—A. No.

Q. Suppose there is a bank which by its constitution would not receive deposits for short periods and which would not have to meet calls at short notice?—A. The Presidency Bank already does that function. I am only asking for its extension?

Q. In what direction?—A. By enabling them to advance money on securities which at present they are not allowed by their Charter to undertake.

Q. Then you are in favour of the Presidency Banks doing the kind of business that the industrial bank would be doing?—A. Yes, with all due and proper safeguards.

Q. You are not then in favour of a separate industrial bank, but you would have an extension of the Presidency Bank in which case there should be a modification of the present charter of the Presidency Banks?—A. Yes.

Q. In practice it would be quite a different kind of thing from what the Presidency Bank is at present?—A. Yes.

Q. When you say that the Indian joint stock banks should be able to afford some help to Indian industries, are you aware that the capital of the Indian joint stock banks is only 12 per cent. of the total capital, whereas the capital of the Presidency Banks is 48 per cent. I do not think they are likely to be able to render very great assistance to industrial concerns?—A. As far as I have seen I think the present banking organisations of the country are able to meet all the requirements. I only say that as far as I can judge though there may be other requirements of which I am not cognisant. But personally I am not in favour of tampering with the present organisation of the country unless some urgent need for it has manifested itself. At present I do not see any urgent need for it. If there is an industrial bank I should make it part of the Presidency Bank.

Q. Assuming that there are some legal difficulties in the way of doing it, would you be in favour of Government putting in a good sum into the industrial bank in order to lend its support in the first few years of its existence?—A. That is a very big problem. That is grant-in-aid in another form.

Q. Don't you think that it would be a better way of helping industries than advancing the money directly in the shape of loans?—A. It would be preferable.

Q. The Government has been helping the Presidency Banks with the use of its money to a very large extent and the Presidency Banks have thereby been able to render help to the export and the import trade. If the Government put a fair amount of money into the industrial bank then the industrial bank would be in the field of promoting industries, what the Presidency Banks have been in the field of mercantile commerce?—A. Provided the industrial bank can also draw money from the public in the shape of deposits. They cannot depend entirely on Government. If you can provide from the public as well a large amount of deposit money in the manner you suggest then there is no reason why the corporation should not take place.

Q. In the case of the Japanese Industrial Bank the Government put in one million yen for five years and allowed interest on that sum to go towards paying a dividend of five per

cent which they guaranteed. Do you think that if the Government did a similar thing here, then the public will also subscribe?—*A.* That is rather a difficult problem. I should doubt whether it would be of much benefit in the shape of drawing out public money. As I have already said, speaking for myself as a business man, I should want to know whether the business existed, and whether there is a real demand for an industrial bank so far as the provision of funds is concerned.

Q. You say that unless the demand for financial help has grown considerably you doubt the utility of an industrial bank?—*A.* I doubt the utility of the industrial bank as a separate organisation. I doubt whether it could be made large enough to justify its existence.

Q. Large in what way?—*A.* In finding sufficient business.

Q. Don't you think that the progress which the industries have been making in the past ten years justifies the view that such a bank will find enough business?—*A.* I think we are apt to run before we have learnt to walk in this matter. If it is proved that the present organizations in the country have not met the demands and the requirements of industry, then I think it is time enough to talk about an industrial bank.

Q. There has been much evidence before the Commission given by Indian gentlemen, including men like the Maharaja of Cossimbazar, that Indian industrialists find it difficult to get accommodation from the Bank of Bengal and the exchange banks. Assuming that there is some foundation for it, will it not be desirable to have an institution which will help these industries?—*A.* I think the Maharaja of Cossimbazaar got it.

Q. Because he is a Maharaja. He got it after he had a solicitor to back him up and he had to sign a pronote with him. The Presidency Bank would not advance money on the security of his pottery works alone?—*A.* I think he has got some collieries and they were put up as second security and his agents also gave their names. But we are all in the same boat so far as that is concerned.

Q. You now find that there are many industries going on in Calcutta. There are many new works. There are pottery works, cotton and jute mills, and galvanising factories. Factories have been growing. Don't you think that in order to cope with the demands that are bound to come from all these industries a bank is needed?—*A.* If, as you say, it is proved that the question of accommodation has presented difficulties, then I for one would not stand in the way of one being started. Personally speaking from my own experience, I do not think that there is sufficient demand to justify a big organisation of the kind that you mention. We ought to try and find some means of assistance in some other way than starting an organisation such as an industrial bank.

Q. President.—If an industrial bank of the kind were started it would presumably take over some of the work that you have indicated, that is to say, advancing money to industrial enterprises backed by respectable firms. In that case it would compete with existing banks?—*A.* Every interest when it sees a prospect of competition endeavours to protect itself. I scarcely see that an industrial bank is necessary. If the Hon'ble Pandit can show me that it is necessary I for one would not stand in the way of such an organisation being created.

Hon'ble Pandit M. M. Malaviya.—*Q.* You are a gentleman with very wide experience, and you can help the Commission by speaking on matters like this with some authority. That is my only excuse for continuing the subject. I just want to point out to you that the industrial banks in Japan are permitted to do a lot of other business besides lending on securities. For instance, some of its principal duties are to make loans on the security of national loan bonds, prefectural and municipal loan bonds, or debentures and shares of companies; to subscribe for or take over by transfer national loan bonds, prefectural and municipal loan bonds, or debentures of companies; to receive deposits of money and undertake the custody of goods entrusted to it for safe keeping, to undertake trust business; to discount bills and to buy and sell bills of exchange and documentary bills of exchange; to make loans on the security of estates created by virtue of special laws; and so on. So that there is no apprehension that if the capital is a large one that it will not find employment?—*A.* It is not the question of capital. It is the question of inducing the depositors. It is not the question of capital. That is a very small item. You have got to induce your depositors to provide the additional funds which could be used profitably in industrial operations. Depositors would not loan funds at probably more than six months' or 12 months' call. I think the probability is that the bank would be left with a lot of unsaleable assets. They would have a large amount of money locked up in industrial enterprises and that is where the big banks are now able to spread their risks over a considerable area, and when the call comes in they are able to weather the storm. I think that any purely industrial bank would have to be handled with extraordinary care, and I do not think there are many of us who would care to face the experience yet. In Japan they have ways and means of doing things which we have not yet attempted.

Q. If it is shown that there is need for a bank of this kind then you are in favour of it?—*A.* I would not stand in the way if the need for one is shown to exist.

Q. In your note you speak of the appointment of a committee and about the difficulty of railway rates. Do you think that this difficulty arises out of the fact that different companies manage the different railways? Don't you think that if the State managed the railways, they would be interested in laying down a uniform policy all round?—*A.* Personally speaking, I am one of those who are in favour of State management of railways. There are a great

number of reasons which have been advanced on both sides. The question of State management involves a complete reorganization, the sweeping away of the Railway Board and a revolution in the methods of railway working in India. I think the change would be rather great to undertake at the present time. It may be worked up to in time, but at present my idea is that the Railway Board is crippled. Either it has not got sufficient power, or it has too much power. I have got a case in point to-day. I do not know why they really exist at present.

Q. If the Board is to continue you are certainly in favour of a more representative element being introduced into it?—A. My suggestion so far as the working of railways is concerned is that nobody who does not understand railways ought to attempt to work them. I should like each province to have a representative committee sitting to consider traffic problems consisting of railway members and commercial members. A policy might be laid down for a period of, say, ten years. This provincial committee will be more or less a voluntary organisation, a sort of advisory committee. They would examine any proposals and bring them forward and would have their representatives who will be the representatives when Government are considering their railway policy for the province. I think it will be a pernicious idea to have people dealing with railway problems who do not understand railways. They would do more harm than good.

Q. You know that the present Board was constituted, because there was a feeling that there should be somebody to represent the Government and look after the interests of those who use the railways. Don't you think that the presence of commercial men would make for the better presentation of the views of the commercial community to the Government as well as the general public?—A. I think it all depends on the men.

Q. I quite agree that much depends on the personality of the members. Assuming that the Railway Board does continue to exist in its present form, don't you think that the presence of such a man will count?—A. I think the advisory committees which I have suggested will carry very much the same weight. You should not have inexpert interference when it is not needed. I know that is the case in our own business. It is much better to have men who have actual experience of the subject than to have men who have not.

Q. Then how would you insure the interests of the general public and the travelling public?—A. I have had a good deal to do with railways for some time. I have been trying to place my views before them, and they do not always listen to me. I am still in hopes that they will do so. At the same time there is this point that too much cannot be expected all at once. If we place our views and case before the railways in a well reasoned spirit and a straightforward manner, we can only hope that they will give the matter their attention and eventually agree with us.

Q. The experiences of certain witnesses before the Commission show that the Railway Board has not been able to redress their grievances in the matter of rates and freights?—A. I suppose there is no one who has been harder on the railways than I have been during the past. The present Railway Board is not powerful enough for the duties they try to assume.

Q. If the State managed all the railways they would naturally consider the interests of the public and the trading community?—A. That is a point that I have my own doubts about. The railways are run for a profit and provide revenue to Government and it does not come back to the railway again. If it were handed over to Government my fear is—and that is my only fear—that that will increase and not diminish.

Q. Is that fear based upon any examination of the working of the State railways?—A. I have spent some of my time in Germany and although there are many points in favour of State working as accepted in Germany, I do not think that Germany is absolutely perfect. I should like to see whether we cannot bring about, through the Commerce and Industry Department, some system by which the views of the traders might be made paramount rather than the views of the railways. Everything depends on the prosperity of the people, and traffic facilities are one of the readiest means of ensuring it. My point is that at present the railway revenue is one of the largest sources of income to the Government, but Government devote it to all sorts of other expenditure. I should like to see railway revenue and expenditure kept apart.

Q. From 1854 to 1900 the railways in India worked at a loss, and it is only since 1900 that they have begun to yield some profit?—A. As regards railway finance I should like to have very much clearer evidence than I have myself been able to obtain on the subject of the amount of money that has been put aside for sinking funds and repayment of capital out of revenue.

Q. With reference to the salt tax, you say "Has it ever occurred to Government to ask the millions of peasants whether they would prefer to have the salt tax reduced or that their grain should be promptly removed and cash paid for it." Have you given sufficient time to the salt question as affecting the health of the people?—A. In the absence of any better evidence to the contrary we may take it as a conclusive proof that the salt tax was to their benefit, in view of the great increase in the consumption of salt? I was looking at the matter more from the point of view of the enormous amount of grain that has year after year lain at mofussil stations waiting to be taken to distant places. Recently whilst travelling from Bombay I am quite certain that 50 per cent. of the stations were absolutely blocked with enormous quantities of corn waiting to be transported. It was rotting in the stations, and had started growing in the bags. What I want to know is whether these people would not much prefer to have their bags despatched rather than get a small reduction in the salt tax.

Q. Do not for a moment imagine that I am against a greater expansion in the way of providing the wagons necessary for transport, and I hope that that expansion is coming. But do not advocate it at the expense of the salt of the poor people?—A. You and I are both at one on that point that the ryot should be benefited in the best possible way.

ADDITIONAL WRITTEN EVIDENCE.

(Submitted after oral examination.)

X.—General.

Coal distillation.

Low temperature coal distillation provides for India, I believe, an industry the development of which has possibilities of a far-reaching character and immense value to the country, and would re-pay the closest and most methodical examination and assistance by Government.

We have many seams of low-grade coal practically all of them containing valuable volatile products and, as the process of low temperature distillation is being rapidly perfected, the suggestion is now advanced far enough for a deliberate effort being made to tackle the question here in India. A cheap smokeless fuel to take the place of wood and dung fuel needs no recapitulation, the demand is enormous for the fuel, similarly for the bye-products. Although there might be some difficulty in using the surplus gas economically, we may yet see coal distillation plants in close proximity to large manufacturing centres which, instead of sending 80 per cent. of the value of the fuel up their chimneys, will first turn the coal into smokeless fuel and bye-products using the gas for driving their plant either by means of gas-engines or gas-fired boilers. I know I shall be accused by some people of presenting fantastic suggestions, but as the Commission have asked for suggestions I am confident in my own mind that this one is well worthy of instant examination by Government and the expenditure of money in proving it.

Waste of coal.

Urgent measures are required for dealing with the terrible waste of fuel which takes place on the Indian coalfields. India will ere long be proved lacking abundant fuel, at any rate, the main supplies are bound to be of an inferior quality, and yet it is astonishing how little regard Government and the Mines Department seem to have for this subject. The position can be most easily gauged by a visit to the Jherria coalfields where seams of coal from 10 to 30 ft. in thickness overlie each other with but short gaps of intervening strata. Large areas of these seams are standing on pillars more or less adequate, and as we are rapidly approaching the exhaustion of the coal-bearing area the value to the country of the pillar coal in the existing mines is inestimable. At present attempts are made to obtain this coal by extraction in the ordinary way and to a certain extent we are assisted by the magnificent sandstone roofs which overlie a large number of the seams, but in spite of all this probably an average of 40 per cent. of the pillar coal is lost whenever the present method of working is followed. The provision of hydraulic stowage is an item of immediate and vital importance and Government should, I consider, be pressed to listen to the views of the practical men on the subject. There are many other systems and causes of waste at present practised due to antiquated methods, for instance 10 to 12 per cent. of the total coal raised has to be expended on pumping and on raising the output to the surface. By means of the electric scheme which we are at present engaged upon, wherein the waste gases from 40 bye-product coke ovens will generate steam in tubular boilers actuating turbines of 2000 K. W., we hope to put at least 250 boilers out of action with a resultant saving of at least quarter of a million tons of fuel per year. At present much waste is prevalent on collieries due to the miners being allowed to carry away for their consumption relatively large quantities of coal for the purpose of cooking their frugal meals. The whole question of waste must be dealt with without delay for, I believe, it will be proved that the best coal in India has already been found in the Jherria and Raniganj coalfields. It would also be proved, I think, that the bulk of this good coal has already been extracted; and probably as much again has been wasted. Finally I shall not be surprised if it is hereafter proved that the only genuine coking coal in India exists in the Jherria field and that the termination of the life of this area is already within sight. Consequently the future of the steel industry, if it is to be dependent on coke for smelting purposes, does not require further dilation by me.

Restricted coal workings under railways and railway land.

This is a subject which requires the immediate attention of Government. The existing situation is very unsatisfactory no matter from what standpoint it happens to be viewed, unsatisfactory alike to railways, collieries, Government and to the community as a whole. The procedure adopted at present, when it is proposed to construct a railway, is that Government acquires the land to all intents and purposes compulsorily and passes it on to the railway company which constructs the line. When the land is acquired by Government under the Land Acquisition Act the minerals are expressly excluded, but the railways in their agreements relating to the construction of sidings and connecting railways to collieries and industrial concerns insist that the public company or private owner shall withhold all claims to any minerals known or unknown under any railway or siding, either on his own or other owner's land, or under any railway connected therewith. The Commission may express surprise that collieries and industrial concerns should ever have accepted such a one-sided arrangement, but this can be readily explained by reason of the fact that in the early days the question was never viewed in a sufficiently serious light, and furthermore as these were the only terms upon which the railways would construct a siding the terms had perforce to be accepted or no railway connection would be possible.

The matter has now come to be viewed in a serious light, for colliery workings are restricted in every direction by railway encroachments. As a result of the census taken by the Indian Mining Association it was ascertained that nearly 200 million tons of coal is locked up under railway sidings and railway branch and main lines, and all this coal will gradually be required ere long in order to maintain the output from Indian coalfields.

Government under the Land Acquisition Act expressly exclude the minerals when acquiring land and promise to pay compensation when the minerals are required. Obviously the present situation is one of uncertainty; it is not the wish of the coal trade to ask for compensation until all and every endeavour has been made to deal with the situation differently. Government recently endeavoured to contract out of their present obligation for providing compensation by an amendment to the existing Land Acquisition Act in which it was proposed to hand over Government's interest in railway land to the railway authorities and company. This effort was checkmated and the question has lain fallow for some time. It is one of the most pressing urgency and a determined effort should be quickly made to deal with it. The output from some collieries is already seriously restricted and this trouble is increasing daily.

I append as a note for the information of the Commission a draft proposal I submitted to Government relating to the appointment of a tribunal which should be able to deal with the subject. This question is one of several others which is of vital interest to the coal trade, and I trust the Commission before it closes its labours will be able to pay another visit to the coalfields and hear the views of practical men on this and many other subjects of vital interest to the country.

Note on a proposed Railway Land Acquisition (Mines) Act Tribunal.

The Tribunal might with advantage be limited to one permanent Member or President,
i.f.—

- (1) A Judge of High Court.
- (2) A Barrister, preferably European, of any of the Indian High Courts nominated by the Chief Justice of Bengal.
- (3) An English Barrister, having particular experience of the subject, to be brought out from home and guaranteed a retainer or minimum salary, to be provided from the fund, for a period of 3 or 5 years, say £2,000 per annum, with liberty to engage in other practice, and a special fee for each case, and with a Registrar or Secretary and office accommodation.

The Tribunal to consist of the President and two temporary assessors, one to be appointed by Government on behalf of the railway interests, the second also by Government on behalf of the commercial community. The assessors would receive fees during the case and during examination of documentary evidence. Upon receipt of a case for examination submitted by both parties for examination and decision the Tribunal would be constituted.

The Railway and Mining Companies concerned would submit evidence, legal or technical, or both, in support of their respective claims, and both sides would bear their own costs of such application and evidence (which would effectually prevent fictitious and frivolous claims for compensation), for I hold that with Government, the railways, the mining community, and the public at large being equally interested in the subject, it is necessary that extravagant claims are combated and prevented.

It is probable that both parties will, prior to submission of their respective claims to the Tribunal, have examined the subject mutually and have definite proposals prepared for submission. The methods of working to be adopted and the duties of the Tribunal will, I anticipate, mainly consist in the adjudication on the fairness of the respective claims and examining the accuracy of the extra expenditure which will have to be met by the parties to win the coal under the railway line concerned, for it must be borne in mind that the collieries will make a profit on the coal won, whilst the railways will secure the freight. The extra expenditure involved must only become chargeable against the fund, and the expenditure will also be spread over the period, short or long, during which the work involved has to be carried out; the Tribunal to have power to call in accountancy or auditorial evidence on the respective claims.

Government should also closely examine suggestions in advance, and, irrespective of the Tribunal, limit this expenditure. As hydraulic stowage will, in my opinion, afford one of the readiest and cheapest methods for preventing undue surface damage, the provision of valueless surface material, or river sand, should be made as cheap as possible. There are, for instance, millions of tons of sand in the beds of rivers within a few miles across country of nearly every colliery, and this sand should be acquired by Government as for a public purpose, and placed at the disposal of the railways and mining concerns at a minimum cost. Such material would be costly if transported by the railways. It would increase short distance traffic and use up wagons required for other general public purposes, but a co-operative system of aerial ropeways could be provided, at any rate in Jerriah field, where the difficulties and expenditure will be greatest. The ropeways should have power to acquire land for the purpose on the same terms as electric line wires and standards, and by working from the river bed to central points served by subsidiary lines, groups of collieries could be provided with material. The question of surface damage now affects colliery interests besides railway maintenance, and this method of working (*i.e.*, stowage) must speedily become general if half of the exist-

ing coal in Jerriah is to be won. Hydraulic stowage might therefore be a means to an end, providing for the railways at the same time as the collieries' general requirements, and the cost of maintaining the railways would by this means be reduced to a minimum.

The amount of money required will, in my opinion, if the public interests are carefully safeguarded, be found to be surprisingly small, and a cess of one or two annas per ton on the present output, at the outside, fixed for a period of 3 or 5 years, would provide a fund which could be drawn upon gradually and which could be reduced or increased as the demands upon it became known at the end of each period.

The fund should be handled conservatively and placed on deposit with the Bank of Bengal, as the interest thereon would soon probably pay the President's retaining fee and that of the Registrar or Secretary.

The fund's accounts should be under the supervision of the Accountant General's Department for audit purposes, or of a firm of Chartered Accountants, the latter probably would cost less and meet all requirements.

The railways should, to my mind, collect the cess by additions to their freight bills, and if they can prove the cost to them of so doing, they should be reimbursed out of the fund by means of an annual sum to be agreed upon after examination. These suggestions have been put forward hastily and no doubt are easily capable of being supplemented and improved upon; they are personal and I do not promise that they would meet the views either of the railways or of all my fellow members of the mining community.

Note on technical aid to the timber industry.

"The existing knowledge of the available *forest* resources of the country can be supplemented" by the practical co-operation of business men.

The manager of a timber business, for example, would probably have local knowledge, and acquire information from sources not available to Government Forest officers. The latter only serve in a district for a term and are apt to look at things from an official aspect with *forest conservation* as the principal object in view. The business man, timber company or sleeper merchant, permanently located in the district would always be on the alert in regard to the commercial possibilities of the forest in his area. Where a forest officer is unable to inspect or determine the value of the production from some particular unexploited area in his division, substantial inducements should be given to business men to investigate such propositions. In some particular forest areas there may be over a hundred different varieties of timber and the royalties charged by Government vary from, say, 1 to 4 annas a cubic foot, though it is well known for wholesale purposes the timber merchant has to classify them under one head as "mixed hard woods" or "mixed soft woods"—or "jungli woods" regardless of the forest classification and valuation. In the present state of forest exploitation an all-round flat rate should be charged instead of different rates for different timbers. It is the extra price recoverable on the better (and always rarer) quality timber which helps to cover expenses of extracting the cheaper (and commoner) qualities. The present system of auctioning standing trees does not tend to encourage private survey or exploitation. It may be suitable in certain districts—but its application all over India without regard to special conditions is a mistake. The man whose bid is accepted one year may be beaten by a few rupees the following year. This does not encourage him to sink money in transport and other organisation for working a forest as he would do, if he was certain of continuity of his tenure. Government forests in places which are "out of the way" and yet within reasonable reach of railways or navigable streams (*i.e.* navigable for lumber) might be found worth the attention of capitalists if an invitation was issued to prospect and investigate their commercial possibilities. *Prospecting licenses could be issued on terms similar to licenses issued to prospectors for minerals—convertable into long leases.*

It is suggested that commercial surveys by commercial prospectors would be more useful both as a means of supplying revenue to Government and ensuring proper exploitation. In the case of minerals, Government leaves the investigation and exploitation of the economic and commercial side to the private prospector. Why should not the same principle be applied to the exploitation of forests. A commercial survey by some expert official, such as the Forest Economist, should be made of all forests in India, and a uniform royalty fixed by him in each province or district.

Commercial prospectors would then know how they stood. At present a 4-anna royalty on a timber like 'toon' might work out at a far lower cost to the buyer than a 1-anna royalty on a timber like 'simal' (Bombax-tree cotton). A toon tree might be felled absolutely on the banks of a river while a simal tree might be standing 3 miles away necessitating tedious manual or elephant dragging—at a cost which would actually make the toon cheaper "to extract." A commercial survey with due consideration for local conditions, such as extraction, distance from markets, should be able to fix an equitable all-round rate and prospectors could then determine for themselves whether or not a working lease was worth taking up. Even if a flat rate for all India was fixed, prices would very soon adjust themselves. It should be borne in mind that the timbers in less demand might have been sold at a minimum profit or in some cases even at a loss—the profits on the better class woods being relied upon to make the whole a workable commercial proposition.

Trade names applied to timbers are often misnomers. In the case of *imported timber* some system might be introduced whereby importers should be made to give an official certificate before admission into the country, stating what the trade name is in country of origin and what is its botanic name and classification. It is quite possible timbers indigenous to India are also being imported to Indian markets under a fancy trade name. A Government expert should be deputed to investigate and classify all the various timbers imported into India. For example, there might be no need for a railway to import a timber known to them by one name, if the same timber, unknown to them, is obtainable in India.

See my remarks about the co-ordination of Forest Department in my written evidence, *reply to II-25*. The Forest Department should send consignments of timber for sale through timber merchants in the bigger Indian markets. Indian business houses might also undertake the sale of consignments on Government account in foreign markets, London and America.

Indenture of apprenticeship for lads employed in Bird and Company's collieries and other works.

This Indenture made this _____ date of 191
Between _____
of
(hereinafter called the "Guardian") of the first part
of
son of _____ (hereinafter called "the Apprentice")
of the second part and Messrs. Bird and Company of Chartered Bank Buildings, Calcutta, Merchants and Agents (hereinafter called "the Firm") of the third part. Whereas the Firm are the Managing Agents of the Companies set out in the Schedule hereto and the Apprentice has applied to the Firm to be admitted as an Apprentice and to serve the Firm at such of the Collieries, Engineering Works, Works Factories, etc., of the Companies set out in the said Schedule hereto or any other Companies of which the firm are Managing Agents as the Firm may think proper and whereas the Firm has agreed to take the Apprentice into articles of apprenticeship for a period of 4 years subject to his producing evidence of the necessary qualification hereinafter mentioned that is to say:—

That the Apprentice is a European or Anglo-Indian.

That the Apprentice has passed a School examination equivalent to the VI Standard and produces a Certificate of good character from the School at which he has been educated.

That the Apprentice is not under 17 years nor more than 19 years of age.

That the Apprentice shall submit his Baptismal or Birth Registration Certificate.

That the Apprentice shall submit a Certificate of general respectability and good character from the clergyman of the Parish in which the said Apprentice resides or a Certificate from some other respectable person not being a relative of the Apprentice.

That the Apprentice shall produce a Medical Certificate as to his general health.

I. Now this Indenture witnesseth that in consideration of the service of the Apprentice to be done or performed to or for the Firm and of the covenants and agreements hereinafter to be entered into by the Guardian and the Apprentice, they the Firm at the request of the Guardian and with the consent of the Apprentice testified by his executing these presents do hereby covenant and agree with the Guardian and also with the Apprentice in the manner following that is to say:—

1. That they the Firm will take and receive the said _____ as an Apprentice from the date of these presents for a term of 4 years and also will during the said term to the best of their power knowledge and ability instruct the Apprentice in the trade or business of _____ at any of the Collieries, Engineering Works, Works Factories, etc., of the Companies set out in the said Schedule hereto or any other Companies of which the Firm are Managing Agents and in all things incident or relating thereto in such manner as they the Firm or any of the said Companies do now or shall hereafter during the said term use or practise the same subject nevertheless to the fact that the first six months of the said term of four years shall be considered as a probationary period during which either the Firm or the Apprentice may at their or his option cancel this agreement during such period of six months by giving to the other of them one week's notice in writing and that the Apprentice shall tender such notice of resignation through the medium of the Guardian.
2. That the Firm will during the said term find and provide the Apprentice with good and sufficient board and lodging in one or other of the Firm's boarding houses set apart for that purpose or in such other place as the Firm may think proper.
3. That in the event of the Apprentice being successful in passing the Government Hindustani examinations the Firm will pay him an honorarium of Rs. 100 upon his securing a Certificate of his having passed in the lower standard and Rs. 200 upon his securing a Certificate of his having passed in the higher standard such sums to be placed to the credit of the Apprentice in the saving deposit account to be opened by the Firm.

4. That during the period of his apprenticeship the Firm will pay to the Apprentice subject to the conditions hereinafter mentioned the following rates of wages :—

- During the first year Rs. 30 per mensem.
- During the second year Rs. 40 per mensem.
- During the third year Rs. 50 per mensem.
- During the fourth year Rs. 70 per mensem.

And also will provide medical attendance and will also pay the necessary fees in connection with the Government Technical Classes hereinafter mentioned provided always that the payment of wages hereinbefore referred to will be subject to the Apprentice's success or failure in passing such examinations as are referred to in Clauses (c) and (e) hereinafter mentioned and also subject to a satisfactory recommendation from the Manager under whom he has served. Continued failure to pass the said examination after three successive attempts will be considered by the Firm as sufficient grounds for cancelling this agreement should the Firm consider that the Apprentice shows no prospect of fulfilling the requirements of the Firm.

II. And this Indenture further witnesseth that in consideration of the covenants and agreements hereinbefore contained on the part of the Firm the Guardian doth hereby place and bind the Apprentice and the Apprentice with the consent of the Guardian doth hereby place and bind himself with the Firm during the term aforesaid ; during which time the Apprentice shall faithfully, honestly and diligently serve the Firm and obey and perform all their lawful and reasonable commands and requirements and shall not do any damage or injury to the Firm or knowingly suffer the same to be done without acquainting them therewith and he shall in all things conduct and acquaint himself as an honest and faithful Apprentice ought to do and for the consideration aforesaid the Guardian and the Apprentice do hereby further covenant and agree with the Firm in manner following that is to say :—

- (a) That the Apprentice shall faithfully, honestly and diligently serve the Firm as their Apprentice during the term aforesaid and also that the Guardian, his executors or administrators will at his or their own expense find and provide the said Apprentice with good and sufficient clothing and all other necessities during the said term.
- (b) That if and when the Apprentice shall reside in one of the Boarding Houses hereinbefore referred to he shall conform to the rules and regulations framed by the Firm for the conduct of the said house and keep such prescribed hours as may be determined necessary from time to time and obey the instructions and orders of the matron or superintendent in charge, the Firm being at liberty to alter such rules and regulations from time to time as they may think fit and proper.
- (c) That the Apprentice shall attend the Government Technical Classes provided in the District in which he may reside the Firm allowing the Apprentice such time as may be necessary for the purpose of attending such technical classes and the Apprentice will be bound to take instruction in such subject or subjects as may be decided by the Firm in conjunction with the advice of the Government Technical Instructors as are considered desirable and necessary for the attainment of his education and he will be bound to sit for such examinations as may be held by the Instructors from time to time.
- (d) That the Apprentice will be bound to attend regular religious worship as may be provided for by the local religious bodies of which he is a member at the place and time as directed by the Firm.
- (e) That the Apprentice will be required to pass the Government examinations at least in lower (colloquial) Hindustani or Bengalee before the expiry of the third year of apprenticeship.
- (f) That the Apprentice will not divulge to any person whomsoever and will use his best endeavours to prevent the publication or disclosure of any trade secret or manufacturing process or any information concerning the business or finances of the Firm or any of the Companies set out in the said Schedule hereto or any of their dealings, transactions or affairs which may come to his knowledge during or in the course of his apprenticeship or employment and will not during such apprenticeship or employment be concerned or interested directly or indirectly nor be personally employed or engaged in any capacity whatever in or in connection with any business whatever other than the business of the Firm or the Companies set out in the said Schedule hereto.
- (g) That the Guardian and the Apprentice shall both be answerable and shall make good all loss and damage which the Firm or any of the Companies set out in the said Schedule hereto may suffer owing to the wilful neglect or default of the Apprentice.

III. And in consideration of the premises it is further hereby agreed by and between the parties hereto as follows :—

- (1) That during the said term of apprenticeship the Firm will deduct from the wages of the Apprentice hereinbefore referred to a sum of Rs. 5 per mensem and such

sum will be credited in the Apprentice's name in a Security Deposit Fund to be opened in the books of the Firm at their Calcutta Office. The said sum of Rs. 5 per mensem and all honorariums and other sums which stand to the credit of the Apprentice in the Security Deposit Fund will bear interest at the rate of 5 per cent. per annum and will be made over to the Apprentice on his completing the full term of his apprenticeship and it is expected that the Apprentice will utilise this money for the purpose of obtaining English training or in the alternative Sibpur Engineering College training.

- (2) That should the Apprentice die during the term of his apprenticeship the amount of the security deposit standing to his credit at the date of his death together with accrued interest thereon shall be paid to his executors or administrators.
- (3) That in the event of the Apprentice resigning his appointment before the termination of the said 4 years' apprenticeship or leaving his work without permission or in the event of his being dismissed for misconduct, irregular attendance or absenting himself without leave or Medical Certificate or becoming unsuitable for the work the whole of the security so deposited as aforesaid shall be liable to be forfeited at the discretion of the Firm.
- (4) That the Firm shall not require the Apprentice to attend to the business or affairs of the Firm for a longer period than nine hours in each day provided always that in the event of pressure of work or unforeseen circumstances the Firm shall be entitled to call upon the Apprentice to work for greater number of hours than above referred to and also to call upon him to work on Sundays or other holidays without any extra remuneration.
- (5) The Apprentice shall be entitled to privilege leave to the extent of 15 days in the year on full pay and he shall also be entitled to 15 days' leave on half pay in case of sickness or production of the Company's medical officer's certificate and in reckoning the period at which the increments fall due the Firm will take into consideration any time lost by the Apprentice on account of sickness and he will be bound to make up such time before any increments will be granted to him and at the end of this agreement will make good such lost time as hereinafter provided in Clause (7).
- (6) That in the event of the Apprentice completing to the satisfaction of the Firm the full period of 4 years' apprenticeship he shall if required by the Firm to do so work for the Firm in any capacity as instructed by the Firm on such remuneration as the Firm shall think fit subject to a minimum of Rs. 130 and maximum of Rs. 175 per month according to his qualifications and in the event of the Apprentice after the said 4 years' apprenticeship refusing to carry out the aforesaid instructions of the Firm when requested to do so the security deposit hereinbefore referred to only shall be repaid to the Apprentice exclusive of any interest that may have accrued thereon and the Apprentice shall not be entitled to a Certificate from the Firm.
- (7) That in the event of the Apprentice neglecting or refusing to obey the orders of his superior officers or of the Firm or being guilty of any misconduct or insobriety and be convicted of any offence or committing a breach of any of the agreements herein contained or on his marrying during the continuance of the apprenticeship the Firm shall be at liberty to cancel this agreement without notice in which case all security deposit together with interest will be forfeited to the Firm. And in case the Apprentice shall through his own act or negligence contract any disease or illness which will render him medically unfit in the opinion of the Firm to perform his duties the Firm shall be at liberty to send him back to reside with his parents or with the Guardian or with such other person or persons or institutions as may be willing to receive him until such time as in the opinion of the Firm he shall be fit to return to his duties and his absence during this period shall not be reckoned as any part of the term under the apprenticeship herein and the Apprentice shall be bound to make good such lost time by continuing to serve the Firm for a further period equivalent to the said absence under the aforesaid circumstances.

The schedule, above referred to :—

Burrakur Coal Company.
 Jumoni Coal Company.
 Nowaghur Coal Company.
 Bhaskajuri Coal Company.
 Budroochuck Coal Company.
 Jamgram Coal Company.
 Lutchipore Coal Company.
 Reliance Coal Company.
 Saltore Coal Company.
 Teetulumuri Collieries, Limited,

Kumardhubi Engineering Works, Limited.
Kumardhubi Fireclay and Silica Works, Limited.
Loyabad Coke Manufacturing Company, Limited.
Sijua Jherria Electric Supply Company, Limited.

In witness whereof the said parties hereto have hereunto set their hands and seals the day and year just before written.

Signed, sealed and delivered by the above
named
and
presence of

}
in the



Signed, sealed and delivered by the above
named Bird & Co. in the presence of

}

BIRD AND CO.'S COLLIERIES AND WORKSHOPS.

APPRENTICES' HOME.

Rules.

1. Apprentices whose parents or other relatives do not reside in the neighbourhood of their work must reside in the "Apprentices' Home", provided there are vacancies.
2. No apprentice will be allowed to leave the house and live elsewhere, without the permission of the firm.
3. Any apprentice who misbehaves himself or makes himself a nuisance to others, on being reported, will be liable to be dismissed.
4. The Home is fully provided with furniture, crockery, linen, etc., and is under the charge of a Matron, directed by the Manager in charge.
5. The senior apprentice will be appointed as monitor, and he will see that apprentices behave themselves when in the Home and that all lights are put out at 21-30 hours.
6. A book will be kept for the purpose and the roll will be called daily at 21 hours by the Matron and no apprentice must be absent without the written authority of the Manager.
7. Apprentices residing in the Home must attend some place of worship, unless they are unable to do so by reasons of illness or other unavoidable cause as directed by the Manager, and the Matron will record such attendance in the daily register.
8. No dogs are allowed in the Home, nor are apprentices allowed to keep pets or animals of any sort without the permission of the Matron.
9. No apprentice will be allowed to be absent for the night without obtaining previous permission from the Manager.
10. Servants attached to the Home must not be sent out on private errands without the permission of the Matron, nor must they be abused or ill-treated. A breach of this rule will be recorded against the culprit, and, if repeated, will be met by severe punishment. If an apprentice has cause to complain of any of the servants, he must report the matter to the Matron of the Home at the time, but on no account is he to take the law into his own hands.
11. No spirituous liquor will be allowed to be brought into the Home by any one.
12. In the event of any damage done to crockery, furniture, etc., belonging to the "Apprentices' Home" through carelessness on the part of any apprentice, the cost thereof will be paid immediately by the apprentice, and in default, the same will be recovered from any sum due to the apprentice in his Deposit Account.
13. Meals will be served as follows:—
Chota Hazri.—Bread, butter and tea at 6-15.
Breakfast.—Meat, curry and rice and bread at 12 noon.
Dinner.—Meat, vegetables, bread and pudding at 17-40.
14. Any apprentice absent at these hours for meals will have to go without, unless he is unavoidably absent, in which case he will advise the Matron.
15. On Dhobie-day the monitor must assist the Matron in checking the clothes going to and coming from the wash.

When clothing is lent to another apprentice and is dirty, it should be put into the bag of the apprentice who owns the article of clothing.

Apprentices are not allowed to give or receive any articles direct from the Dhubie. This must be done through the Matron.

Managing Agents.

The 1916.

I have read the above rules and agree to abide by them as part of my signed Agreement.

Signature of Apprentice.

Signature of Parent or Guardian.

STATION, }
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WITNESS No. 186.

MR. W. MAXWELL, *Kamrup Government Farm, Nalbari Station.*

Mr. W. Maxwell.

The oral evidence of this witness is confidential. He did not submit written evidence.

WITNESS No. 187.

(1) HON'BLE MR. J. DONALD, I.C.S., *Secretary to the Government of Bengal, Financial and Accounts Department.* (1) Hon.^d Mr. J. Donald.

(2) MR. J. A. L. SWAN, I.C.S., *Secretary, Board of Revenue, Bengal.*

(2) Mr. J. A. L. Swan.

(3) MR. A. R. MURRAY, *Member, Provincial Industries Committee, Bengal.*

(3) A. R. Murray.

(4) MR. G. H. W. DAVIES, I.C.S., *officer on special duty, Industries, Bengal.*

(4) Mr. G. H. W. Davies.

They were examined orally in a conference the proceedings of which are confidential.

WITNESS No. 188.

MAJOR A. T. GAGE, I.M.S., *Director, Botanical Survey of India.*

Major A. T. Gage.

WRITTEN EVIDENCE.

The scientific staff of the Botanical Survey of India consists of a Director, an Economic Botanical Survey Botanist and two Indian assistants. The same officer who, under the Government of India, of India, is Director of the Botanical Survey and is in administrative charge of the Industrial Section of the Indian Museum is, under the Government of Bengal, also Superintendent of the Royal Botanic Garden, Calcutta, of the other Gardens in Calcutta, of the Lloyd Botanic Garden, Darjeeling and of Cinchona Cultivation and Quinine Manufacture in Bengal. His multifarious administrative duties in connection with those posts afford him few or no opportunities for research work either apart from or in common with the Economic Botanists of other departments.

The two Indian assistants are fully occupied in classifying and identifying the vast collections of herbarium specimens that have accumulated during the last thirty years and that are constantly being added to. Although incidentally those systematic assistants may be able, within limits, to aid in the elucidation of the systematic side of any economic enquiry, it is essential for the primary purpose of the Botanical Survey that their work should be determined by purely systematic and not economic considerations.

The Economic Botanist is in executive charge of the Industrial Section of the Indian museum. His main work at present is and, for some time to come, must be concerned with the improvement of the public gallery of that section, although, for the time being at least, subsidiary to this work, economic investigations take up part of the Economic Botanist's time. As experimental cultivation on a practicable scale is not possible those investigations are limited to the systematic or literary aspects of an enquiry. They are none-the-less valuable on this account and often are of direct commercial importance, as, for instance, in the identification of spurious seeds wholly or partially substituted for genuine ones, or in the identification of the source of a dye, or a gum, or a tanning agent, or such like.

The question as to what can be done to correlate the activities of the Botanical Survey Department with those of the various Economic Botanists in the Forest and Agricultural

Departments therefore reduces itself to an examination of the relation of part of the work of the Botanical Survey Economic Botanist to that of the botanists of other departments. Stating generally, there always has been correlation—mostly unofficial but none the worse of that—between the botanists of the Forest and Agricultural Departments and the Botanical Survey. The Forest Botanist has made considerable contributions to the collections of the Botanical Survey. The contributions from the Economic Botanists of the various agricultural departments have naturally been rather less as their opportunities for collecting have been fewer. On the other hand the staff and the collections of specimens, books and drawings of the Botanical Survey have always been free for consultation by the Forest and Agricultural Botanists and have frequently been consulted by them.

When a Forest or Economic Botanist undertakes an investigation it is usually with a direct practical aim in view, such as the discovery of the cause or causes and prevention of the deterioration of a forest crop, such as *sal*, or the improvement in the yield of some agricultural crop such as wheat, cotton, sugar, indigo, etc. The enquiry is usually one mainly of scientific experiment involving cultivation and field as well as laboratory observations. On that side of an enquiry the Economic Botanist of the Botanical Survey could give little or no aid nor is his aid required. In the course of such investigations, however, questions of species distinctions, nomenclature, and such like may arise. The investigator may be quite competent to deal with such questions but may not be able to afford the time to study them, or may lack the specimens and literature necessary to thresh them out, or the investigator may distrust his competence to deal with that side of his enquiry. In either contingency the Economic Botanist of the Botanical Survey could render aid as he would be likely to have all or most of the specimens and literature required at hand. As an instance of what is meant I may state that when Mr. Maxwell Lefroy came out to India recently in connection with sericultural work he appealed to me for aid in identifying the various species of plants used as food by the silk worms. I instructed the Economic Botanist of the Botanical Survey to discuss at the meeting of the Board of Agriculture—then about due—with Mr. Lefroy direct the difficulties of the latter and to endeavour to clear them.

I presume it is not expected, and I would not consider it advisable from either the scientific or the official standpoint, that the botanists of other Departments should necessarily share every investigation with the Economic Botanist of the Botanical Survey. It should suffice for them to know—as most if not all of them already do know—that any aid that the Botanical Survey Department may be able to afford them is at their disposal at any time.

If more official semblance in co-operation is considered necessary it should not be difficult to evoke it. The Economic Botanist to the Botanical Survey is a member of the Board of Agriculture, of which the various other Economic Botanists are also members or at least could attend the meetings thereof. During the period that the Board of Agriculture holds its meetings it should be feasible for the various Economic Botanists to discuss their various programmes and problems and to arrange for the best disposition of the research work in connexion therewith. The Forest Botanist is, I believe, not a member of the Board of Agriculture but that should not preclude him from discussing with the Economic Botanists problems that may affect both his and their work in common.

Cultivation of
drug yielding
plants.

As regards the question as to whether further work like that done in the Cinchona Plantations can be organised for other drug yielding plants I am of opinion that it could. A certain amount of such work is already in progress. Emetine, one of the alkaloids contained in *Psychotria Ipecacuanha*, a small plant belonging to the same family of plants that yields quinine, is practically a specific for amœbic dysentery. As this disease is common in the tropics and sub-tropics the desirability of ensuring a supply of the curative drug requires no advocating. The plant was introduced into India some forty years ago and has been in existence on the Government Cinchona Plantation, Mungpoo, in the Darjeeling District, ever since. It is only, however, within recent years that sustained efforts have been made to cultivate the plant with a view to the ultimate extraction of the alkaloid on a commercial scale. Thanks to the unremitting care taken by Mr. P. T. Russell, the Manager of Mungpoo Plantation, there are now about 100,000 plants in existence on that plantation and large annual additions to the stock are assured so that in a few years time it should be possible to manufacture emetine in the quinine factory on a commercial scale. Other drug yielding plants that have recently been experimentally and successfully cultivated either on the Cinchona Plantation or in the Royal Botanic Garden, Calcutta, are *Hyoscyamus niger* and *Digitalis*. Merely from the cultivation point of view a considerable number of drug yielding plants could be grown in some or other of the various regions of India, such as *Chenopodium anthelminticum* (oil used in Hookworm disease), *Taraktogenos Kurzii* (oil used in treatment of Leprosy), *Strychnos Nux-vomica* (yields Strychnine), *Carum copticum* (yields Thymol), *Cassia acutifolia* or *C. angustifolia* (yields Senna), etc. Given the necessary staff and equipment it should be quite feasible to undertake the systematic cultivation of any or all of these species and the improvement, where desirable, of the quantity or quality of the yield.

ORAL EVIDENCE, 18TH JANUARY 1917.

Mr. C. E. Low.—Q. How is the programme of the Economic Botanist laid out in your department?—A. Well, it is practically made out by him and myself in consultation together. Of course the programme is usually made up so as to avoid conflicting with the programmes of the various Economic Botanists. Their work we know more or less; we know what they are going to take up.

Q. What principles are followed in laying it out; what subjects do you ask him to take up?—*A.* The subjects practically speaking are those which are not taken up by any of the other departments. That reduces it to a rather small number of subjects. There are very few which they do not take up, but the chief will be medicinal plants. These so far have not been taken up to any great extent by any other department although I noticed in the last programme of the Forest Department that the chemist was investigating such things as Strychnine and Brucine, etc.

Q. Does the Economic Botanist take up this question of gathering plants from the chemical point of view, or from the point of view of improving the yield?—*A.* Neither of these in fact; he scarcely has the time or the equipment to deal with yields of drugs. In order to do that it means that you must have a considerable amount of land at your disposal for experimental cultivation. He has none of those opportunities. His work is mainly—as indicated in my note—on the systematic and literary side.

President.—*Q.* No experimental work at all?—*A.* Practically no experimental work. There is no land available.

Mr. C. E. Low.—*Q.* He sees to plants that are likely to grow?—*A.* Yes, to a very limited extent. We could set aside small plots of land down at the Botanical Gardens at Sibpur, quite enough to judge whether they could be grown with fair ease in the climate of Bengal.

President.—*Q.* I suppose he is a sort of Economic Intelligence Officer?—*A.* Yes. He is that primarily.

Q. Then if you attend to any one of your six big duties have you any time left for research work?—*A.* I have practically no time at all.

Q. And whatever activities you can spare must be concentrated on this part of India?—*A.* Yes.

Q. So that, from the point of view of your department, you cannot do much more than take an intelligent interest in other parts of India?—*A.* That is about the limitation.

Q. And from the point of view of pure botany, would there not be enough work of a valuable kind for a staff very much larger than you have got?—*A.* There would.

Q. You have got a small number of botanists including yourself scattered about in other departments in India?—*A.* Yes, taking all the other departments in India, we certainly have. Within the Botanical Survey we have only two other men exclusive of myself. We have practically no time for active research work.

Q. Does it not strike you as undesirable that they should be scattered about?—*A.* It would certainly tend to greater economy of effort if there were some central co-ordinating organization.

Q. There are two ways of dealing with any scientific subject that you want to turn to economic account. One is classification from the point of view of the subject itself having sub-divisions devoted to their economic aspects; the other is forming a series of departments, to which the subject applies, and providing your establishment within that department; for instance, in the case of Forests they have their Forest Botanists of sorts, and it strikes one that the other classification is quite worth considering, namely, that you should have a big Botanical Survey containing all the reasonable varieties of botanists that you can afford and then spare your officer for the application of their products to agriculture and the forests?—*A.* What was practically that suggestion was submitted to Government a few years ago by the Board of Scientific Advice.

Q. What happened?—*A.* Government accorded the scheme its sympathy but it has remained at that.

Q. They did not send it to the Royal Society?—*A.* No, not to the best of my recollection.

Q. You are still of opinion that it would be better to organise the botanical services in India, on lines not exactly similar but nearly so to that adopted by the Geological Survey?—*A.* Practically so; that is the opinion that was given several years ago by a Sub-committee of which, if I recollect aright, you yourself were a member.

Q. We have met a case of this kind on our travels. We found at Pusa two Economic Botanists who were doing mainly pathological work, Dr. Butler and his assistant, and the assistant was devoting his energy to forest questions. That is a case in which no harm was being done, and it did not matter as he was doing good work, but it shows that even a botanist under the Agricultural Department can be used for botanical work under the Forest Department. There are therefore no reasons why a botanist of the Botanical Survey should not devote his energies to botanical research, to agriculture or anything else?—*A.* No reason whatever. He should not be averse to taking up any problem that turned up.

Q. In regard to publication it has been suggested to us that if the whole of the botanical output in India were issued under one department, not necessarily under one publication, you could issue the whole of the botanical output of India under one department, and then the papers that have direct application to agriculture could be reproduced in whatever agricultural journals they may be, and those on forests could be reproduced in the Forest Department publications. There would be no harm in duplicating a paper but there would be very great harm in not finding a paper when wanted. It has been suggested that it would

be an advantage if the whole of the botanical publications were gathered under one head. That would be the authority for the whole of India. Do you think there would be an advantage in that?—*A.* I decidedly do. I said something to that effect in the Indian Science Congress held last year.

Q. Your paper was published in the Asiatic Society's Journal?—*A.* Not in *extenso* but a short resumé.

Q. You have not referred to this question specifically in your note?—*A.* I endeavoured to confine myself to the matters put before me for opinion.

Q. We should be very glad if you could give us a note * on the subject for our own published record, *i.e.*, the organization which you consider to be desirable, not only in nature but also in science, for the prosecution of botanical research in India, with reference to its application to economic botany. That would help us a great deal, because I have my own ideas on this subject?—*A.* Yes.

Q. If you had a botanical paper which bears on agriculture, it would be the duty of the Agricultural Department to republish that paper in its own publication?—*A.* There is one objection; if the Agricultural, or any other department, are going to reproduce it, it amounts to duplicating the whole thing. Why not have one distribution list to everyone?

Mr. C. E. Low.—*Q.* You meet a man like Mr. Leake, who has been doing some work on crossings of cotton. He does not publish it in the "Agricultural Journal in India," because the ordinary people who read that publication would not be interested in it, as it has no practical bearing on agriculture; don't you think that a good many men among the Economic Botanists in the Agricultural Department, who are doing work of that sort, which either does not see the light at all or only in papers outside India which would be collected and published and read in India; if you had some journal devoted to publications of this sort would that not be desirable?—*A.* I quite agree with you. There is always the conflict between a man's outlook and his own department. It may be better from his own point of view to publish in European journals than in an Indian one.

Q. If we can make an Indian journal so representative in character that it would pay a man to publish in it, because as far as technical publication is concerned, publishing in the Geological Survey paper is as good as publishing in any paper in the world, it gives the journal a purchasing value by exchange?—*A.* As regards such a publication as the "Journal of Indian Agriculture," that has a relatively more restricted circulation. There are the Memoirs of the various Agricultural Departments, which have a circulation to a very great extent duplicated by the publications of the Botanical Survey Department. If it is intended to publish and then reproduce, you have a double distribution.

President.—*Q.* If you made a discovery of botanical value and published it in one of the publications of the Agricultural Department and somebody else were later on to make the same discovery and publish it in a recognised journal, the other person would have a claim to its benefits; but if you had a publication which was recognised and you published that discovery there, it would obtain precedence at once. That, of course, from a scientific point of view, is as important as taking out a patent and advertising it?—*A.* (No answer).

Mr. C. E. Low.—*Q.* Do you think as a matter of fact that botanists outside India are interested in the Memoirs of the Agricultural Department?—*A.* I should not think so, except so far as the papers are of general botanical interest.

President.—*Q.* We also noticed this at Pusa, that Dr. Butler had published practically the whole of his work in the German tongue and that even his specimens were stored in Berlin. Do you consider that that was right?—*A.* It is rather difficult to see what he could do otherwise. The authorities on the subject were German botanists. There is no one within the British Empire who was quite capable of collaborating with him in the same way.

Q. That is a very special case and even if you had a botanical journal established in India you would think twice before you refused him permission to publish elsewhere?—*A.* That was practically the only way of getting his paper published at all, as he was collaborating with these botanists. The German publication is about the only publication of its kind.

Q. If this Botanical Survey was organized on the scale you consider necessary you would be keen in having together in the same department the economic as well as the scientific department?—*A.* I adhere most certainly to the view already expressed to Government by the Board of Scientific Advice. It should have a staff of at least eight officers; eight higher trained men and about as many assistants.

Hon'ble Pandit M. M. Malaviya.—*Q.* How long has this Survey been in existence—the Botanical Survey—when was it first organised?—*A.* As a nominal Botanical Survey, it was started in 1891 or thereabouts.

Q. When do you think it was really organised?—*A.* It never has been, properly speaking.

Q. Has the staff that you mention, the scientific staff, been the same staff from 1891?—*A.* The staff has practically remained the same. The real, actual, working staff, when it was first started, consisted of the Superintendent of the Royal Botanical Gardens who was given the designation of "Director of the Botanical Survey," so that he might be able to advise the Government of India direct upon botanical questions. It made not the slightest difference to his work or his staff, his appointment as Director being purely an honorary

* *Vide* Additional written evidence printed after oral evidence.

one. Under him as Superintendent was the Curator of the Herbarium. Both he and the Curator are officers, so far as their pay is concerned, of the Government of Bengal, and they were not allowed to travel outside of Bengal and Assam without special permission. To all intents and purposes the Botanical Survey was more or less a nominal thing. You will find in the official lists about that time such officers of the Botanical Survey as the Officer in charge of the Botanical Survey of Northern India, and the Government Botanist, Madras, and I fancy the official designation of the officer in Bombay was the same. They were all associated, and were called the Botanical Survey of India, but it existed only on paper.

President.—*Q.* You are practically the same as you were in the beginning of the last century?—*A.* In some respects it was even less at the end of the century than it was at the beginning. Somewhere about the fifties, there used to be an Assistant Curator of the Herbarium, as well as the Curator of the Herbarium. He was got rid of.

Hon'ble Pandit M. M. Malaviya.—*Q.* Fairly, this ought not to be called the Botanical Survey. It does not deserve that high designation?—*A.* I have no objection to its being called the Botanical Survey of India. The only fault is that it is understaffed.

Q. What is the duty of the two Indian assistants?—*A.* They are chiefly concerned with working up collections made in various parts of India, either by themselves or by officers of the Botanical Survey. What education have they received?—*A.* They are University-trained men.

Q. Have they received special training in botany?—*A.* They have all gone through a course of training in botany, either in Madras or Calcutta.

Q. Have you the training of Indian assistants to higher offices in future as one of your objects?—*A.* Yes, so far as the limited opportunities afford, but this is mainly for some time in the future, because the organisation of scientific teaching in India will require to be much more thoroughly developed than it is at present before Indian trained men are quite able to take the place of officers who have had a training in the schools of Europe.

Q. Do you think that in view of the future requirements of the country a certain number of such students should be sent abroad to complete their education?—*A.* I think instead of exporting students from India, in order to obtain education abroad, it is possible to get that education in India by improving the quality of the education in this country.

Q. How do you think that could be done?—*A.* I am afraid I cannot give a satisfactory answer to that question, on the spur of the moment. I have very little to do with educational matters.

Q. You will agree that provision should be made for the better teaching of botany in this country. Don't you?—*A.* Yes, it ought to be.

Q. About this manufacture of drugs, is there any systematic work being done, except what you have mentioned, in the way of planting cinchona and manufacturing quinine?—*A.* Not what I would call systematic. There have been certain sporadic attempts to grow medicinal plants but there has been no co-ordination in the work and no means of judging it on a scientific basis.

Q. Neither is there any machinery for providing the starting of manufacture on a large scale?—*A.* Not as far as I am aware.

Q. In view of the requirement of drugs in India, do you think there should be a fairly adequate establishment to judge what can be done, and see it done properly?—*A.* Before I could answer that question I should like to have some idea of what the demand for drugs in India is at present. I am in complete ignorance of that.

Q. Can you not form an idea of that demand from the reports you receive of the requirements of hospitals in the various parts of the country and the importation of drugs from foreign countries?—*A.* As a mere matter of cultivation, a good many of these plants could be cultivated in India. But whether they could be cultivated commercially, so as to compete with drugs at present imported from abroad, I do not know.

Dr. E. Hopkinson.—*Q.* Does not that come within the functions of the Economic Botanist?—*A.* Not the commercial side. He is not competent to deal with that point.

Q. Not even to ascertain what the demand would be?—*A.* That is no part of his functions; he could ascertain it but I do not consider it as part of his functions to go into the commercial aspects of the matter.

Q. Then it is no one's function at the present time?—*A.* At present there is no organisation in India which can bring together the various factors which have got to be considered in starting any industry based on plants or their products.

Hon'ble Pandit M. M. Malaviya.—*Q.* The Economic Botanist is concerned only with finding out what he can about certain things in his own way. There is no organised attempt to find out what drugs ought to be grown and what manufactures can be made out of those drugs?—*A.* None that I am aware of. There is a body, of which I am a member, called the Indigenous Drugs Committee, but it is a perfectly hopeless body. They find nothing or next to nothing of any real value.

Q. Does it ever meet?—*A.* I am a member of it. It is several years since they had a meeting that I know of.

Q. Is that constituted in Bengal?—*A.* It is under the Government of India.

Q. When was it constituted?—*A.* About a quarter of a century ago.

Q. How long have you been a member of that body?—*A.* Ever since I have been Director of the Botanical Survey about ten years.

Q. And you have never been called to attend a meeting of that Committee during the ten years?—*A.* I have attended several meetings.

Q. What is the nature of the work it takes up?—*A.* It takes up, say, one particular drug which is reputed to be a cure for some particular disease or diseases. It writes to the Medical Storekeeper, or some other officer from whom the drug can be obtained, to arrange to distribute it to various people who may or may not be competent to deal with it, and who for lack of laboratory appliances in most cases could not adequately find out the physiological reactions of the drug.

Q. There is no organisation at present to take up this important question?—*A.* I am not aware of any organisation that works in an efficient manner.

President.—Q. Would you put any of your proposals before the Indigenous Drugs Committee before you moved in the matter?—*A.* No. I would not dream of such a thing.

Q. You are aware that there are large quantities of drug-producing plants exported for the extraction of drugs at home and in Germany. These might be manufactured in this country. That would be beyond your immediate province?—*A.* It would. If one is going to investigate such questions he would want an enormous staff.

Q. Supposing that any one exported a drug-producing plant, your Botanical Survey, if fully equipped, would take notice of that fact, and the Indian Medical Stores Department would also be conscious of it. These two would get together with a view to investigating that drug in the country. The Botanical Survey would take up the question of improving that plant, or finding out more about its habits, etc., while the Stores Department would be responsible for the manufacturing work. You imagine that there would be a good deal of valuable work in that direction by co-option of the two departments, and that is now neglected simply because it is not your business to attend to it?—*A.* As a matter of fact it is no use my planting those drugs if no one cares a straw, and if there is no demand for them.

Mr. A. Chatterton.—Q. Do you get any enquiries from manufacturing chemists' firms such as Smith Stanistreet & Co., and D. Waldie & Co.?—*A.* We have had enquiries from Smith Stanistreet & Co. about such things as atropine.

Q. The difficulty experienced was to get any one who has sufficient botanical knowledge, and sufficient knowledge of cultivation of these plants, to undertake to look after the plantations in which to grow them. Is there any one in the Botanical Survey capable of doing that work?—*A.* Merely as regards the qualification of the officers it could be done, but as far as their actual time is concerned we could not possibly do it.

Hon'ble. Pandit M. M. Malaviya.—Q. As the President has reminded you, a lot of medicinal drugs are exported out of the country. Do you know that a lot of these used to go to Germany and is it a fact that Burroughs, Wellcome & Co. import a lot of drugs which had been manufactured in Germany to be used in England?—*A.* I do not know anything about the activities of Burroughs, Wellcome & Co.

Q. Do you know that since the war began there has been a shortage in the supply of medicines to India and the pinch has been felt in almost all the hospitals in the country?—*A.* I am aware generally speaking that there has been a shortage of drugs.

Q. Don't you think in view of the large plantations and of the large variety of medicinal drugs which can be grown in the country there ought to be a demand that some one should make it his business to see what medicinal drugs should be grown and what medicines can be manufactured in this country?—*A.* That certainly can be done and should be done. If we get the Botanical Survey sufficiently staffed, we could undertake the botanical side of it but in order to find out the best way of extracting the active principles from such plants we would require a pharmacist, or a chemist, or both.

Q. It may require co-operation between two or more departments or several departments as the problems are so interconnected, but you think that there should be provision made for the study of these drugs, and for their plantation, and for the manufacture of medicines from them?—*A.* I certainly think there ought to be some means of discovering how to make the best use of the medicinal plants we have or which could be cultivated in this country.

President.—Q. In your view it opens up a big field?—*A.* It opens up a considerable field.

Dr. E. Hopkinson.—Q. Was the Economic Botanist appointed with the specific purpose of becoming Curator?—*A.* Not nominally so; in order to explain that I would have to go back to the history of the case. The department in the Indian Museum, the Industrial Section, was under the Trustees, and the same officer who was Reporter on Economic Products was also in charge of the Industrial Section. As his work increased, it was found impossible for him to do it all. Consequently the necessity was discovered of having a Curator whose business it would be to look after the Industrial Section. The gentleman who was appointed as Curator was a Chemist and actually had nothing to do with the Industrial Section as far as the public collections were concerned. When Government decided to abolish the Department of Economic Products, and amalgamated it with the Botanical Survey of India, the question arose of giving a proper designation to the officiating Reporter on Economic Products. He could not be

called Curator of the Industrial Section chiefly because there already was a Curator of the Industrial Section, although the official Curator did not do curating but did chemical work; consequently, at the suggestion of the officiating Reporter on Economic Products, the designation given him was Economic Botanist to the Botanical Survey of India. The designation I would have suggested was Curator of the Museum which was a designation selected by the Board of Scientific Advice, but owing to the difficulty of there being a Curator who was still on the staff, we had to adopt this designation "Economic Botanist to the Botanical Survey," but I regard his Economic Botanical work as merely subsidiary to his work of improving the public collections and making them an educational museum. He can only have a small amount of his time devoted to economic research.

Q. How is it that the Economic Botanist, otherwise the Curator of the Industrial Section of the Museum is also the principal member of your staff?—*A.* He is, because he was transferred on the abolition of the Department of Economic Products, the only officer in the Botanical Survey before that time being the Director, except nominally those who are in various parts of India. In the official list you will see Mr. Leake put down as an officer of the Botanical Survey. He has nothing to do with it in any way.

Q. I suppose there is a Botanical Survey of India still going on?—*A.* So far as the limited staff will permit it.

Q. It consists in the receiving of specimens at the museum and putting them in the herbarium?—*A.* Yes, that is a considerable part of the activities of the department, and takes up a good part of the time.

Q. There is no field work going on?—*A.* Oh, yes.

Q. Whom do you send out; you have only the two Indian assistants to send out?—*A.* We have also the Economic Botanist who goes out.

Q. But he is tied hand and foot in the museum?—*A.* We release him for the time being and send him out.

Q. The museum cannot walk away?—*A.* No, but he can for the time being. We have practically the three men who are available, the Economic Botanist and the two assistants, but they can only go for a limited period.

Q. Is there any relation between the herbarium in the Indian Museum, and the herbarium at Pusa, or do the two things go on quite independently?—*A.* Quite. We have nothing to do with each other.

Q. Pusa knows nothing about you?—*A.* Oh, yes; because practically all the Economic Botanists in India have sooner or later to visit at the Botanical Gardens and consult the Herbarium.

Mr. C. E. Low.—*Q.* Do you know anything about the herbarium they are making up at Nagpur?—*A.* I have never seen it.

Q. Have any plants been sent to you for identification?—*A.* Oh, yes; from all the Economic Botanists all over India.

Dr. E. Hopkinson.—*Q.* What do you consider to be the principal function of the Botanical Gardens?—*A.* The principal function, of course, as far as actual use is made of it, is to provide a place for the people of Calcutta to have a pleasant picnic!

Q. But has it any other functions?—*A.* Oh, yes. It was started with a very definite purpose in view. It was started in order to try some plants which were at the time of its establishment of great importance, such as the variety of spices in the Eastern Island, and also for the experimental cultivation of timber trees, such as teak. In fact at the beginning of the last century a considerable area of the garden was teak plantation, but although at its start its main function was economic, it very gradually has come about that there is no longer any such necessity for spending most of its energies on the economic side of things, and it is now purely a scientific institution.

Q. Is any experimental cultivation going on now?—*A.* Practically none. There is no call for it. It would be merely wasting our energies to do with our depleted staff what the staff of the Agricultural Department can better do, because they have more ground at their disposal.

Q. Is it intended to serve an educational purpose?—*A.* Yes.

Q. What means are taken to that end?—*A.* You mean in the way of providing guides.

Q. Yes, and having suitable catalogues?—*A.* We have, as far as possible, named the trees with their scientific names. I myself published several years ago the first part of a comprehensive catalogue. You can go round the garden and get the names of any plant in the garden simply by looking at the number on the tree, and looking at the book.

Q. Is that catalogue out of print?—*A.* I am not aware of it. The guide book is out of print.

Q. I personally made several efforts to obtain something in the nature of a guide book but could not obtain one. The only thing I could get was a map showing the means of exit?—*A.* Undoubtedly that side of it could also be greatly improved but that is a very slow process.

President.—*Q.* What is the area of the garden?—*A.* About 270 acres.

Dr. E. Hopkinson.—*Q.* You think that the garden notwithstanding that it is so remote from Calcutta might serve a really useful educational purpose?—*A.* Undoubtedly.

Q. And it is only a question of staff?—A. And funds.

Q. Are there funds obtainable for such a purpose?—A. I am afraid not. We have just enough to scrape along.

President.—Q. Are the expenses met by the Bengal Government?—A. Yes.

Q. Do you still publish reports of the Botanical Survey?—A. Yes.

Q. Are they issued regularly?—A. No, just as we find material.

Q. And the Memoirs?—A. No, the Annals. That is a Garden publication. The report is a Botanical survey publication.

Q. Is there any special reason except past custom that you should stick to the word "Botanic" for the "Garden" and "Botanical" for the "Survey"?—A. It is simply history or tradition. It was originally called "Botanic."

Dr. E. Hopkinson.—Q. You have explained why the Economic Botanist of the Botanical Survey can be a member of the Agricultural Department, but why do you suggest that more co-operation is necessary?—A. I think the question was put to me as to how the activities of the Botanical Survey Department could be correlated with those of the botanists of the Forest and Agricultural Departments. If official reciprocity is required I said that, as a matter of fact, nothing more is required. We do co-operate, and I think I have cited instances of it.

Q. Do you mind taking the particular case of Emetine; who first discovered that Emetine was contained in the particular plant you mention?—A. I am afraid I cannot tell you that. It was a considerable number of years ago. I can quite easily find out.

Q. But having been discovered, who then proceeded to show that the plant could be grown in a particular district?—A. That was in Sir George King's time. In the early seventies Mr. Lister brought out from Edinburgh a collection of plants which I think had originally been got through Kew from South America to Calcutta. They were experimented with for several years in the Botanical Garden, where it was found that they were not doing very well, and were sent up to the cinchona plantation, and have been there ever since.

Q. With whom did it rest to push the cultivation to ensure sufficient production of the drug?—A. It rests in the long run for me to push, but it is no use for me to push it unless I get some assurance that it is going to be made use of.

Q. Whose business is it to inform you that it is required and is of therapeutic use?—A. I do not think there is any organization for me to be informed. It would probably depend upon the initiative of some officer like Sir Leonard Rogers, who would refer the matter to Government and Government would write to me.

Q. Where would you cultivate it?—A. On the cinchona plantation.

Q. Supposing the area available in the cinchona plantation was insufficient, is it the business of any department of Government to take it up further? Have you done all in your power to do?—A. It would have to be taken up in the same way as this extension of quinine. I could be put on special duty. If it were necessary to extend, some similar measures would have to be adopted.

Q. The quinine factory is under your control?—A. Yes.

Q. If you saw good reason to do so, you would follow a similar course in regard to ipecacuanha?—A. Yes.

President.—Q. There is another cinchona plantation in the Nilgris?—A. Yes.

Q. Is that under your charge?—A. No.

Q. You have no say as to whether that has been worked properly or otherwise?—A. Not officially.

Q. Have the Madras Government got a staff in charge of that cinchona plantation?—A. Yes, they have a staff.

Q. Do they manufacture cinchona there?—A. They manufacture quinine and other alkaloidal salts.

Q. Supposing you had perfected your plant here for the manufacture of quinine, or had found out the very best way of growing the cinchona for that purpose, your improvements here would not necessarily be applied at once in the Nilgris?—A. Not necessarily.

Q. And only by the merest friendly co-operation or fluke it would be; there is no official translation?—A. No.

Mr. A. Chatterton.—Q. Might I ask you if you were consulted about the appointment of Mr. Wilson?—A. I was unofficially consulted.

Q. Have they appointed a botanist?—A. Yes.

Q. Is that a larger plantation than the Bengal one?—A. No. It is much less. There are two plantations in Bengal 40 miles apart. One covers 15 square miles and the other 11 or 12. We have actually under cinchona about 3,000 acres.

Q. Have you got a factory for extracting the alkaloid?—A. Yes. We have a factory that can turn out about 50,000 lbs. of quinine per annum.

President.—Q. There might be cases of plants being grown in the Nilgris, more efficiently than in the Darjeeling area; therefore if the two plantations were directly under the Botanical Survey, work of that kind could be better done?—A. I think so.

Q. This present divided system you think has no advantage at all?—A. The two departments are apt to take provincial views. After all the production of quinine is an imperial question.

Mr. A. Chatterton.—Q. Do you advocate the establishment of similar Government plantations for producing drugs of medicinal or economic value?—A. I am inclined to leave that an open question. I have not sufficient data to form an opinion on that point.

Q. There is a considerable amount of secrecy exercised by people who are growing drugs?—A. If it were possible, it would be better if the cultivation of most of these drugs could be taken away from private enterprise.

Q. The difficulty, I understand, in private enterprise is that it is a very risky thing to start the cultivation of drugs, you do not know whether you are going to get a market for it. I know of one or two instances in which drugs are being cultivated with extreme secrecy. The only idea is that they may be able to command a market to make money out of it?—A. The question would require to be considered far more than I have been able to do as to whether any particular drug should be taken up by Government.

ADDITIONAL WRITTEN EVIDENCE.

NOTE ON THE ORGANISATION OF ECONOMIC BOTANICAL RESEARCH IN THE INDIAN EMPIRE BY MAJOR A. T. GAGE.

(Submitted after oral examination.)

The problem of determining the most suitable organisation for the prosecution of economic botanical research in the Indian Empire is by no means easy to solve. Organisation of economic botanical research.

Were the question concerned only with the purely scientific sides of botany, as morphology, classification histology, physiology, chemistry of plants and plant products and such like, the best solution would be to form a central organisation for the Indian Empire. Of course even in purely scientific investigation centralisation is limited by practical considerations, mainly political and geographical. An official Botanical Survey—even if confined to purely scientific investigations—for the British Empire would be an impracticable proposition. Within the Indian Empire there are no obvious political hindrances to a central organisation for purely scientific research while the very different physical—in a wide sense—conditions in the various parts of India and Burma would be merely incidental factors adding interest to the investigations themselves but not materially affecting the organisation for carrying them on. A properly staffed and equipped Botanical Survey could investigate along any or all of the lines mentioned above equally well the vegetation of the Rajputana deserts or of the mountains of southern Burma.

When the economic aspects of botanical research in their relation to agriculture, forestry, horticulture and such like enter into the problem, the practical limitations that affect the scope of centralisation of pure scientific research not only become more restrictive but are reinforced by others.

Were the area concerned of small or only moderate extent, did it form a single political entity, were its physical conditions more or less uniform and its population more or less homogeneous, undoubtedly a central organisation could conduct effectively both purely scientific and economic botanical investigations. The Indian Empire presents very different conditions. It is of immense extent with enormous variations in physical conditions; it is divided into more than twenty politically separate provinces and States, and it contains a great variety of races with different languages, habits and ideas.

Now while in purely scientific investigations these factors are mostly merely incidental, in economic questions affecting agriculture and forestry they may be and often are of great practical importance. These political economic and social conditions are so numerous, varied and complex that I doubt very much whether a single central self-contained organisation could gain and retain such an intimate knowledge of them as to enable it to direct with efficiency throughout the Indian Empire researches for which such knowledge is indispensable.

It is true that a central organisation deals or attempts to deal with all branches of geological research throughout India and Burma and the confines thereof. It does not however necessarily follow that what may be the best possible means for conducting all lines of research in one science is also the best for another. A comparison of botany with geology, as far as the economic aspect of research is concerned, holds good only to a limited extent, for the element of time and physical, climatic, political and human factors enter more largely into questions of the former than into questions of the latter.

Let us suppose a central organisation with a large staff including a band of "economic" botanists theoretically ready to undertake any research in any part of India or Burma. A demand comes from a particular province for the improvement of an agricultural crop, and an economic botanist is deputed to that province for the work. The botanist—whether he be an "expert" in the particular crop or not—is at least well grounded in the principles of plant improvement, which are of general application. He finds, however, that he has to supplement his scientific knowledge by acquiring a knowledge of all the local conditions, physical, climatic, Disadvantages of centralisation.

agricultural, etc., some or all of which may vary considerably within the province. He has to undertake experimental cultivation, possibly in more than part of the province, and has to keep a close and continuous watch on both field and laboratory work. If the problem is complicated as is not unlikely by chemical considerations, he has to arrange for co-ordination with a chemist. Now neither the improvement of a crop or the introduction of a new one, whether it be a field or forest crop, can be accomplished quickly. It is a work not of months but of years. Until the botanist had finished his work, it might be and probably would be difficult, if not impossible, for the central organisation to call him off to another province—even for work of the same kind—without detriment to his work in the first province. Such a contingency as more provinces calling within the same period for the same sort of work to be done than there were botanists qualified to undertake it available, would not be unlikely to occur.

Other and similar difficulties that I need not enlarge upon would quite likely arise.

An Economic Botanist of an Imperial Department would no doubt gain a very comprehensive knowledge of some crops or forest formations, but it would be offset by his ignorance of others. It would be impossible for each and all of the Economic Botanists of a centralised department to gain a comprehensive knowledge of all the agricultural and forest crops of all parts of the Indian Empire, and they would tend to become a body of specialists. Specialism in itself is not necessarily an evil. According to circumstances its advantages may overbalance its disadvantages or *vice versa*. I am inclined to think that in the present case such specialism as would almost be inevitable in a huge central organisation would have more disadvantages than advantages. It would be impossible for the Economic Botanists to perform their work properly by visits from headquarters. They would have to spend their service moving from province to province, a few years in each, having to learn a fresh set of local conditions with each province. It would be difficult, if not impossible, for them to set up permanent homes, and though this might not affect the popularity of the service while its officers were young, it would not tend to contentment later on. While nominally officers of an all-embracing Imperial department, they would in practice be under the orders of the Government of whatever province they might happen to be working in, for no central organisation could afford to ignore the wishes of provincial Governments in regard to the Economic Botanists' work.

Provincial research establishments.

The alternative scheme is for each political division to have its own staff of economic botanists. The advantages would be that the botanists in any particular province would after once gaining be in a position to retain a thorough knowledge of all local conditions; the principles of plant improvement or of plant introduction being of general application the botanists could undertake in succession or simultaneously the study of different crops—agricultural or forest—while keeping a watch if necessary on their previous work, without having to learn a new set of local conditions; they would readily co-ordinate their work when necessary with that of the provincial chemists, assuming of course that chemical research had not been subjected to centralisation; they would enjoy a practically permanent home, a personal factor by no means negligible.

Of course a system of rigid provincial organisation is not free from disadvantages. Provincial economic botanists although having an intensive knowledge of the crops and conditions of their own province might have their usefulness impaired by lack of knowledge of crops, methods and conditions in provinces other than their own. This disadvantage could be overcome by permitting or better compelling the provincial economic botanists to visit other provinces at intervals.

If the choice lay between the alternatives of a single central organisation to deal with all economic botanical research of whatever kind throughout India and Burma or separate provincial organisations, I am of opinion that the latter would be the more practical method.

Combined Imperial and provincial research.

There is however no necessity to be confined to a choice of alternatives. It is well to recognise that both systems have their advantages and disadvantages. Both may be made to appear in theory mutually exclusive, but in fact they are not necessarily so, and it is possible to utilise both, and I think to better purpose than either alone. It has been found impracticable either for the Government of India to rule in detail the whole Indian Empire or for the provinces and States thereof to be entirely independent. The provinces are allowed to manage their own domestic affairs as far as is thought possible free from interference by the Government of India, but questions that affect the inter-relationships of provinces or the Indian Empire as a whole have to be dealt with by the Government of India. The same conditions or some of them at least that affect the political organisation affect also the organisation of scientific research, which after all is or should be part of the functions of Government. Purely scientific investigations which form the basis for all economic research would best be carried out by an Imperial department, but the great bulk of economic botanical researches in so far as they would be of local importance would most effectively be carried out by provincial organisations.

Provincial Governments and provincial officers are apt to be astoundingly ignorant of other provincial Governments and other provincial conditions and could not deal effectively with questions affecting the Indian Empire as a whole or that demand special knowledge for their solution or with researches that call for special qualifications. As instances may be mentioned the general question of the destruction of forests by shifting cultivation; afforestation problem; the cultivation of cinchona and other medicinal plants. No research in the

chemistry of plant products, such as oils, resins, oleo-resins, gums, dyes, tans, medicinal alkaloids and glucosides is of quite a special character, is independent of local conditions and could be conducted better by specialists attached to an Imperial department than by provincial chemists who would ordinarily be occupied with quite other work.

I am of opinion, therefore, that the best organisation would be—what to a certain extent already exists—provincial departments to deal with purely provincial questions and a central Imperial scientific department or several such departments to deal with general questions and special problems and to act in an advisory capacity to the Imperial Government and, if need be, to the provincial Governments as well.

The Imperial departments nominally at present in existence that deal or should deal with Existing Imperial economic botanical questions are—(1) the Botanical Survey of India, a negligible quantity ; organisation. (2) the Imperial Forest Institute, a rather less negligible quantity ; (3) the Imperial Agricultural Research Institute. Centralisation being as it were the theme, I may as well endeavour to finish it by discussing the feasibility or otherwise of amalgamating those departments into one to deal with all such questions of pure and applied botanical research that could not be undertaken by provincial departments. The idea of amalgamation may be a pretty one, but I am not enamoured of it. Headquarters could not be amalgamated for the natural conditions suitable for a central Agricultural Research Institute would not serve for an Imperial Forest Institute. The task of directing research in all lines of pure botanical research and along the multitudinous branches of agriculture, forestry and horticulture would be far beyond any one man however heroic his physical and intellectual powers might be. The theoretical advantage of amalgamation would be co-ordination of work. At present this is rather limited, but the reason is not any unwillingness of the various departments, but that their staffs—especially those of the Botanical and Forestry departments—are too hopelessly small and overburdened with routine work to allow of co-ordination on any effective scale.

The Botanical Survey of India—the high sounding designation of which implies that it takes the Indian Empire for its field—has a paid staff of one European—who is also in charge of a Museum that is intended to illustrate the vegetable products of the Indian Empire, a work that would fully occupy several officers if done properly—and two Indian officers. The superior scientific staff of the Imperial Forest Institute consists of five men. There is also one Forest Research officer for the whole of Burma. All have routine work to do in addition to research. Now, considering the vast area of the Indian Empire and the exiguity of staff just mentioned to talk of lack of co-ordination as if it were the only serious defect of the present organisation would be merely to indulge in academic twaddle.

As already stated centralisation of research, like centralisation of everything else, has practical limitations, and I am of opinion that these limitations have already been reached. What is wanted is clear recognition of the facts that the Indian Empire is an immense and complicated area, that the economic potentialities of its vegetation are almost boundless, that these potentialities have little more than begun to be scientifically exploited and that there must be a liberal expenditure of capital to enable research to be undertaken on a scale commensurate with the field. There need be no fear of the capital expended not yielding a satisfactory return. The Agricultural and Forest Institutes and the Botanical Survey despite their small staffs have already proved that very effectively in connection with such subjects as wheat, cotton, *sal* and cinchona. Necessity for extension of scientific departments.

Once the staffs of the various departments concerned with pure and applied botanical research are sufficiently strengthened to cope with the immense field of work that still lies untouched, there will be no difficulties in effecting co-ordination. Agriculture, Botanical Survey and Forestry are all under the same department of the Imperial Government, and it should be easy to arrange for conference, free discussion and mutual help.

In regard to publication of the results of research I am of opinion that complete Publication of centralisation of publications is as impracticable and undesirable as complete centralisation results. of research. From the distribution standpoint some individuals or institutes would require only agricultural papers, some only purely botanical papers, some only forestry papers and some all kinds of papers, but even the last class of readers would not want the papers mixed up indiscriminately in a single publication. So, even if publication were centralised for the whole of India and Burma, there would still need to be separate sections for purely botanical papers, for agricultural papers and for forestry papers. Separate editors or editorial committees would also be necessary as no one man would ordinarily possess the qualifications to edit all kinds of papers. In short, if complete centralisation were attempted, the result would practically be the arrangement at present in existence, whereby the forestry papers are all in one set of publications, the agricultural in another and the purely botanical in a third, and whereby an individual, university or society, can obtain whatever papers may be required.

What is to be deprecated is the existence of unnecessary provincial journals. The central and provincial departments would require to possess copies of each other's publications, and it would be a gain in economy all round if there were for the Indian Empire only one set of publications for each branch of pure or applied botanical research. One difficulty is that private workers in, say, pure botany would not necessarily contribute to a central official publication for purely botanical papers, so long as mixed societies such as the Asiatic Society of Bengal publish purely botanical papers mixed up with all sorts of other papers in their journals. Another difficulty is exemplified by the publication of purely botanical

papers in a journal like "The Indian Forester," which is mainly concerned with technical forest papers. Yet there is a good defence for this procedure, for it is only by publication in such a journal that the majority of Forest officers—who are unlikely to subscribe to purely botanical journals—can readily obtain botanical information of practical use to them. On the other hand, botanists may easily overlook the existence of such papers in what is to all intents a technical journal. The remedy here would be to publish such papers in both botanical and forestry journals, which would not be difficult to arrange for.

WITNESS No. 189.

Mr. H. A. F.
Lindsay.

MR. H. A. F. LINDSAY, I.C.S., *Director-General of Commercial Intelligence.*

WRITTEN EVIDENCE.

I will try to be brief in handling a very complicated question. I am afraid the Commission cannot count on me for any expert knowledge of technical processes, and my only justification in venturing to give evidence at all is a keen interest in the broad aspects of the problem, backed up by visits to a few leading industrial concerns in the course of tours. There are some broad principles which force themselves on one's attention at the outset and I propose to record these principles as they have struck me personally. In the course of touring my principal object in visiting factories and industrial concerns generally has been, firstly, to obtain from the organisers as much information as I could get as to the difficulties with which they had to contend; and, secondly, to encourage them to state in their own words the solutions which seemed to them most feasible. For many industries in this country success and even existence mean a prolonged and up-hill fight. If anything is to be done to aid the men in the fighting line the simplest plan seems to be to find out from them the handicaps under which they are fighting and to consider not only how the actual handicaps can be removed but also—the constructive aspect of the question—what assistance is necessary to ensure progress. I wish to point out at the start, therefore, that any recommendations I have to make are based largely on suggestions personally received from business men. Finally I am afraid that, owing to limitations of technical knowledge, I am not able to answer many of the questions. I will, however, answer a few which appear especially relevant to the line taken up.

2. To state the general position first as I understand it. There is of course the broad fact that a very large proportion indeed of India's wealth is derived directly and immediately from the soil. Her exports of raw material are enormous. During the last pre-war year 1913-14, the exports classified under this head in the Trade Returns totalled over 80 million sterling; and exports under the head "Food, Drink and Tobacco," most of which are unmanufactured, were well over 40 million sterling. The class "articles wholly or mainly manufactured" amounted only to 36 millions, the total exports exceeding 160 millions for the year. It is a very real thing therefore to say that India is primarily an agricultural country; and the enormous mass of her exports of raw produce show how extremely successful she has been in this rôle. Her natural bent is agriculture. It is fostered by advantages of climate and soil; it is an occupation congenial to the vast mass of her labour forces; and it gives full scope for the employment of her indigenous capital. At first sight, therefore, one is tempted to conclude that if any special effort is to be made to assist Indian industry, it could most economically be applied to improvement along existing lines. To stimulate the development of Indian manufactures is indeed from some points of view distinctly dangerous. In the first place waste is involved, for it means a diversion of effort from congenial to less naturally congenial occupations. In the second place European examples have shown the danger of any measure tending to stimulate abnormally the exodus of labour from the country to the towns. At the same time there is undoubtedly a very general desire on the part of educated India that manufacturing enterprise should be encouraged; and the two great advantages anticipated—one, that national education cannot be complete without the technical knowledge fostered by manufacturing experience, and the second that for many manufactures, originally luxuries now necessities, India should be independent of foreign markets—seem to outweigh, and rightly, other considerations. A serious danger would arise if the establishment of Indian manufactures could only be effected by measures so artificial and expensive that the general cost of living in the country was forced unduly high and that, in consequence, the production of food grains and other raw products could no longer be effected as cheaply as they are at present. Stated in other words, if the development of Indian manufactures involved any contraction of the area under cultivation this would seem to prove that progress with manufactures had been too rapid. It is very doubtful, however, whether this danger is sufficiently close to merit being taken into account at present.

3. I now turn from the general aspects to examine in some detail the actual difficulties with which industrial concerns are at present faced in this country. Most of these difficulties are obvious, but I have ventured to try to record them all the same; for, as already stated, the first step towards effectively helping a man is to find out what his trouble is. The principal difficulties, I take it, are as follows:

- (1) Difficulties connected with the climate. The extremes of heat and cold, dryness and moisture are very great and the liability of goods to deterioration is in consequence serious.
- (2) Indian labour, although content with low wages, has yet to be educated. Although it has devised and still carries on the cultivation of crops by methods more economical, perhaps, than any yet in force elsewhere, it has not yet learnt to carry out technical processes on economical lines, i.e., without undue waste of tools and machinery, without considerable supervision and without undue deterioration of quality. A close example of this is the fact that, although Indian *gur* is an established industry and safe from any foreign competition, so far as *gur* itself is concerned, the production in India of sugar as known in the European markets is still very backward.
- (3) Indigenous capital is already actively employed in agriculture, the reason of course being that it can count on favourable conditions of climate and soil and on economical methods of management. Business organisation, however, which is essential for manufacture on a large scale, is at present lacking, with the result that capital does not come forward readily to support manufacturing enterprise. The result is that progress is extremely slow. Public capital will not come forward until it can rely on a plentiful supply of capable business managers, who are naturally themselves not forthcoming since capital is so unwilling to employ them. This is one of the most vicious of the circles which the Commission are asked to short-circuit.
- (4) Transport by land is costly. I believe I am correct in saying that railway freights are generally at low rates in India compared with the rates in other countries. But the distances are enormous. It is no consolation to a paper manufacturer who has to bring his raw materials to a convenient centre from areas up to 300 miles away, and scattered in a semi-circle 300 miles across, to know that the railway rates are even a half of those paid by the principal manufacturer of foreign pulp, with whom he is competing, if his rival has only 20 miles to go for his raw material. Indeed many Indian industries—I think the glass industry is a fair example—find it safer to entrench themselves in central Indian sites close to their raw material, where they are protected from foreign competition by the length of the railway “lead” from the nearest port. I think then that the complaint against the railways, when pressed to its logical conclusion, resolves itself into a complaint aimed not so much at the stiffness of Indian railway rates as at the length of the distances to be traversed, and the unduly high proportion borne by transport charges in the costs of manufacture and marketing. The records of this department are full of instances which will support this contention.
- (5) Another complaint which I have received is with regard to departmental rules governing concessions for the exploitation of State produce, principally mineral and forest concessions. Here there is of course a serious conflict of interests. The intending exploiter is naturally anxious to get rich quickly, while on the other hand the State must keep an eye on the future and husband its resources (especially in the case of forests). With regard to minerals, strict supervision is necessary to prevent unscientific extraction and equally to prevent concessionaires from retarding their operations in one locality in order to stifle competition and specialise on other concessions which pay them better. I have not gone into any of these points in detail as criticisms from unofficial witnesses commercially interested will doubtless be forthcoming and will be backed by better technical knowledge than I possess. Evidence will doubtless be given also on the question of excise restrictions and their effect on the manufacture of industrial alcohol. This was dealt with in the eighth resolution of the first Indian Commercial Congress held at Bombay on the 26th December 1915.
- (6) Complaints are often received against the operation of the Stores Rules. These rules, although encouraging local purchases by Government officers where quality and price are not unfavourable, fetter the discretion of purchasing officers and are for this reason criticised by manufacturers in this country.
- (7) Finally, and of course most important of all, the chief difficulty is that of competition from overseas manufacturers, producing goods on a large scale and therefore able to dump them cheaply in this country. Personally I have been very much impressed when on tour by the vitality and enterprise of many of the Indian industrial concerns I have visited. The war and high freights are of course in their favour and at present there is much prosperity. There is no doubt that industrial enterprise is spreading even in face of competition from the Japanese and others of the world’s cheap manufacturers. But development, to be permanent, must be gradual, and there is one aspect of the present situation which contains to my mind elements of danger. High prices abroad and high freights have encouraged the local manufacture of many articles which have been developed extensively since the war began. In Europe many of these

industries would depend for their very existence both on the cheap supply of raw materials or partially manufactured articles and on a ready market for bye-products. Both conditions are essential to a great many industries and where this is the case one has grave doubts whether such industries can survive with a return to normal trade conditions. As a country in which manufactured and partially manufactured articles are generally dumped pretty freely India already has one advantage, that of being able to obtain cheaply many of the semi-manufactures necessary to a complete process. It is the market for bye-products which is to my mind the serious difficulty in India and one too easily overlooked.

4. I now turn to consider the suggested remedies. There will, I fear, be some inconsistency with the previous paragraph, as the difficulties experienced have not necessarily each a separate remedy. In stating the recommendations I have received, therefore, I do not propose to set off each against any one of the individual difficulties already mentioned; but will classify them for convenience on a separate line, namely, according as they involve more or less direct Government interference with Indian industrial enterprise, taking first the proposals which seem to involve the greatest interference. At this point I wish to draw attention to what appears to me the radical principle underlying the whole problem. What Government are after, I take it, is not merely to create a number of industries and then to arrange the conditions in such a way as to ensure their continuance. Such a course is undoubtedly possible, if only sufficient revenue is forthcoming. To my mind, however, a solution on these lines would be disastrous. The cry-for assistance to Indian industries arises surely from a very real and intelligible craving for business training, business experience and the business instinct which both will produce. To imagine that India merely wishes to be able to point to a number of subsidised factories and to base upon them a claim to a place among important manufacturing countries of the world is to underrate the whole movement. It is only from business training and experience that any real progress can be expected.

5. The following is a brief survey of the principal recommendations which may be advanced :—

- (a) One has heard much of the State subsidy. To my mind this proposal, namely, of direct grants by Government, stands condemned in the light of the principle suggested at the end of the preceding paragraph. What the State is required to do is surely not to find capital itself but to encourage the conditions in which capital is attracted to manufacturing enterprise. This tendency would be checked in two principal ways if Government itself should step into the arena. In the first place although private capital might and probably would be attracted to concerns subsidised by the State it would not unnaturally regard as unsound enterprises not hall-marked by Government assistance of this kind. Secondly, and by way of corollary, the State will itself be undertaking the function which the public must gradually acquire by experience, namely, that of distinguishing enterprises *a priori* sound from those which are less sound. An essential factor in the development of business instinct must surely be an attitude of healthy criticism which can fully appreciate the promising aspects of a scheme without being blind to its defects. Government cannot subsidise all industries and, in selecting some for financial assistance, it takes upon itself a responsibility of choice which must be borne by capital, if capital is to come forward on thoughtful and intelligent considerations.
- (b) There are much the same objections, though not perhaps to quite the same extent, to the proposal that Government should guarantee interest on capital forthcoming to assist promising nascent industries. For the Government guarantee may tend to a premature—and possibly often erroneous—discrimination between the sheep and the goats of industrial enterprise. Here, however, we are directly faced with the precedent of the dyes schemes of England and Japan. I am not sure that the application of these precedents to India is altogether sound. The conditions in England were peculiar when “British Dyes Limited” was floated. The raw materials for dyes lay ready to hand and the products were essential to many English manufactures; moreover an early start was necessary to ensure continued employment to textile labourers during the war. In India, however, it would be a long and expensive business to organise the manufacture of chemical dyes on a effective, *i.e.*, extensive scale. Moreover the prospects of a ready sale of the by-products are not assured. The Japanese are already regretting the experiment; please see attached extract* from the “Japan Weekly Chronicle,” dated 24th August 1916.
- (c) We now come to less direct forms of Government assistance which, while not involving direct monetary subsidies, assist by reducing the costs of production. There is little doubt that much could be done to stimulate ready and cheap supplies of private capital if the co-operative movement were extended to manufacturing industries. Although I have no personal experience of the co-operative movement I understand that in some provinces a beginning has already

* Not printed.

been made in this direction. Difficulties with regard to railway transport, mineral, forests and excise concessions have already been noted. There is no doubt that both Government and the railways have already done much to minimise the costs of production and transport. Much still remains to be done, however, under both heads. To the impartial observer the difficulty appears to be one principally of attitude. If the attitude of the officer granting the concession is, not so much what is the utmost return I can secure for Government, as, what is the maximum which the concessionaire can pay and yet make a profit on the business—then much help could be given which is at present not forthcoming.

- (d) I now turn to two further suggestions, very commonly put forward for Government assistance, which are directed to the cheapening of technical direction and management. There is little doubt that India badly needs a research institute run on up-to-date scientific lines and capable of giving practical advice at a reasonable cost to business managers. The institute would have to be a large one and capable of sending experts to advise on technical difficulties locally experienced. It seems essential that the experts should form a service organised on much the same lines as the Geological Survey; that is to say, an Imperial Service whose members are ready to assist in solving provincial problems under the control of their Director. With this recommendation I would couple another almost as important, namely, the careful reorganisation of the system of State technical scholarships. The training at present given by means of these scholarships could not probably be improved upon. I think, however, that greater care might be taken with regard both to the selection of the candidates and to their employment when the training is over. I am in favour of a system under which, after selection by Government of particular industries requiring assistance of this kind, actual business concerns engaged in such industries are invited to nominate candidates for the scholarships offered. There would also be a guarantee from the employer that he would give further employment to the scholar on his return. Indeed the closer the relations between the employer and the scholar the better, guaranteed full educational qualifications in the latter. A system such as this would go far to increase the number of scholars anxious for the training for its own sake and willing to turn it to account; and therefore also, in time, the number of business managers in this country having an up-to-date technical knowledge of the concerns under their control. In this connection I venture to draw attention also to the non-existence in India of any real system of apprenticeship. As the Commission are doubtless aware it is dangerous for any employer to take in an apprentice unless he receives a guarantee that the apprentice will not, on the expiry of his apprenticeship, join a rival concern and give away the trade secrets he has learnt. Indian Courts, however, have held that such guarantees operate in restraint of trade and are therefore unenforceable. I understand, however, that evidence on this point has already been given to the Commission and it has doubtless been backed by more detailed knowledge than I can personally furnish.
- (e) Finally with regard to Government contracts and with special reference to the Stores Rules, I am not sure that we are not somewhat hampered in the country by the precedent of British industry and its practical independence of Government purchases. In India, the position is different. Many concerns are, as it is, enabled to struggle successfully with foreign competitors in the Indian markets by their reliance on Government contracts involving settled business at fixed rates. I think that Messrs. Tata and Sons were glad of a Government guarantee to take a certain quantity of steel rails annually; and paper mills also rely to some extent on Government orders. Even though the rate of profit may be low it affords a basis on which extensions of business can satisfactorily be made. One would be glad therefore to see indenting officers encouraged to arrange contracts for terms of years with manufacturers in this country, subject to guarantees of quality. With regard to the Stores Rules, there are two directions in which I would be glad to see existing rules improved. In the first place I think it would be an excellent thing if branches of the best British firms were encouraged to settle in this country and stores usually indented from home were imported through them. The result would be to raise the standard of manufacture in this country, to extend our knowledge of up-to-date European methods, and ultimately it is hoped to encourage manufacture in this country by branches originally established merely to attract orders to some manufacturers. I believe I am correct in saying that this proposal is at present under the consideration of Government. In the second place, I would draw attention to an article which appeared in the "Pioneer" of the 8th September 1913, copy* of which is attached. There is much in this article with which I do not agree, but I would strongly support any proposal such as that made at the end of the article that the Stores Rules should be rules for guidance only; that

* Not printed.

the Stores Department of the India Office should merely offer facilities for purchase; and that purchasing officers in this country should have full direction to purchase either through the Stores Department or else direct, in the most convenient as well as the best markets available. I understand that this is very much the system adopted by the Self-Governing Colonies.

6. On the assumption that the Commission will be able to accept some at least of the practical recommendations put forward for the encouragement of Indian industries, I now turn to administrative aspects of the proposals outlined above. I wish, however, first of all to draw attention to what appears to be a very serious initial difficulty. Government Departments are naturally prone to simplify the work of the executive officers by laying down rules which will cover the majority of cases likely to come up for disposal under those rules in the ordinary course of administration. To my mind, however, it will be difficult, if not impossible, to deal with Indian industries on similar lines. Not only each industry but each separate concern engaged in that industry will require treatment on separate lines. An industrial survey would doubtless be able to analyse the organisation of individual concerns and the treatment to be accorded to each; but the danger is that the record of such a survey very quickly falls out of date and the officers appointed to pass orders on its recommendations would very often find it necessary to revise its conclusions on new data subsequently coming to light. What appears to be necessary, therefore, is not so much an initial survey, to be completed by a certain date and then submitted for orders, as a continuous survey in which the officers deciding each case would be in close and constant touch with developments as they arise in each industry and each concern scrutinised.

7. It is evidently impossible, even if a Director of Industries existed in each province, that this officer should find the time, in addition to his ordinary duties, to analyse the possibilities of individual concerns within his jurisdiction. He would be able to give the best advice possible on recommendations put to him but he would presumably not be in a position to deal finally with each. I think, therefore, it would be necessary to organise special machinery for this purpose which would be in close and direct touch with local Governments on the one hand and with individual industries and concerns on the other; and the best solution would appear to be the appointment of a Board on which the Director of Industries and business men would find a place. The functions of the Board would be to examine the very different conditions in which different manufacturing concerns at present work and the assistance which is needed by, and should be given to, each. This Board would be presided over by an officer who would also supervise agriculture and co-operation in the province. He would in fact carry out the functions suggested for the Development Commissioner in paragraphs 199 and 200 of the Report of the Committee on Co-operation in India. It will doubtless be accepted as an axiom that the wider the discretion given to the Board the better will be the results of its work. In fact it would probably be found desirable to allot to it lump grants for the spending of which it would be responsible to the local Government. The detailed powers of the Board are however matters which it is useless to discuss at this stage. The chief point which I would venture to emphasise is that the various forms of assistance which can be given by Government to individual concerns—by scientific advice, by reduction of royalties, excise fees, railway freights, etc.—are very numerous. It is essential to ensure a very careful scrutiny before deciding what form of assistance a concern needs and must receive if it is to develop on healthy lines, and whether the grant of such assistance is practical in each case. The Board might be empowered to summon the help of officers of the research institute, when required, and with the concurrence of the director of the institute. The Board would not merely assist existing concerns, but would also be in close touch with local capitalists and would draw attention to industrial openings, hitherto unoccupied, on which the experts' reports were favourable. The Development Commissioner should control agricultural development and co-operation, as well as industries, in the province. This would ensure co-ordination of effort between all three, a point on which the Bengal District Administration Committee laid stress in paragraph 224 of their report.

Answers to Questions.

Financial aid.

I have no direct experience of pioneer factories or of industrial co-operative societies. With regard to questions 5 and 13, please see opinions expressed above regarding direct financial aid by Government. To my mind the system of direct finance is dangerous; firstly because to be effective it would have to be given to selected concerns which could only become popular at the expense of their rivals; secondly, and as a consequence, because capital would tend to follow the lead given by Government and would shun other ventures. For these reasons I am of opinion that any form of direct subsidy should be avoided and that the assistance given should be general *e.g.*, by technical advice, instruction, etc.—which would be made available to all industrial concerns able to prove that they will turn this assistance to effective account.

Commercial museums.

The commercial museum at Calcutta at first attracted a large number of visitors chiefly on account of its novelty; the visitors belonged to all classes. Subsequently however the numbers declined and the museum is now chiefly frequented by business men both European and Indian. To my mind the chief functions of the museum and all exhibitions generally is to bring buyers and sellers together. I don't entirely agree with the writer of "Commerce and Companies" in the "Pioneer" of the 13th instant that Government should organise selling

agents or agencies. In doing so to any great extent it would have to undertake responsibility either for quality or payment and this responsibility could not be assumed without financial risk. The method adopted at the museum is to encourage enquirers to place trial orders on order books provided in the museum. About 330 orders have been placed already, mostly for small amounts, but in some cases for considerable sums. Subsequent correspondence is direct. Efforts are also made to bring the exhibits to the notice of foreign importers.

Q. 37.—I am arranging for the exhibition of samples of articles required by the principal Government Departments, the manufacture of which might be undertaken or improved in this country.

I concur in the recommendation of the Committee on Co-operation in India that Development Commissioners should be appointed; but I think each should be assisted by a Board of which the Director of Industries (preferably a business man) and other business men should sit. Please see above.

Q. 83.—The reorganisation of the Commercial Intelligence Department is under consideration, involving considerable additions to staff. I correspond at present chiefly with Directors of Industries, Collectors of Customs and Scientific Departments in India; and with the Board of Trade (Commercial Intelligence Branch) in the United Kingdom, Trade Commissioners in the Colonies and British Consuls or their Commercial Attachés abroad. I am also dependent very largely on advice and assistance ungrudgingly given by Chambers of Commerce and business men in India. I would like however to be able to supplement these sources of information by reports from paid correspondents in centres from which I have at present difficulty in obtaining information. I understand that the proposed reorganisation includes provision for correspondents of this kind.

Q. 84.—The chief advantages of the *Indian Trade Journal* are two-fold: firstly, in introducing buyers and sellers by means of trade enquiries and secondly as a convenient record of Government orders, statistics, etc., and used as such largely by Government officers but also to some extent by business men. In future I would like to see some interest imparted to the journal by publishing weekly letters of trade openings for Indian industries in Indian markets as received from the paid correspondents already mentioned; and later on, if Indian Trade Commissioners are appointed abroad, by letters on openings for Indian trade in foreign countries.

Q. 87.—I would like to see the journal supplemented by occasional monographs or bulletins bringing together in convenient form all information regarding any particular Indian industry or trade. Taking paper for example, a bulletin would summarise the results of scientific enquiries into suitable materials available in India and where they are to be found. Correspondents would work up trade conditions in the local markets, the prices at which competition is experienced from foreign paper and the particular grades in local demand.

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President.—Q. There is a little confusion as to the relative functions of the Director-General of Commercial Intelligence and the Director of Statistics. People imagine that the man who makes up statistics ought also to draw lessons from the statistics. I suppose that the present practice is for him to be the compiler of statistics and the Director-General of Commercial Intelligence makes use of those statistics in addition to other information?—A. That is so.

Q. Is it your opinion that the two departments should be separate as they now are or should they be organized into one?—A. Going back over the history of the Department I think it was too much for one man to be able to prepare the statistics and also to make the deductions. That was certainly the experience of Mr. Noël Paton. He was absolutely unable to supervise the preparation of statistics and also to answer commercial enquiries satisfactorily.

Q. Would not the natural solution be for him to be provided with a statistical staff?—A. He had a statistical staff.

Q. He could have an officer like the Director of Statistics or a Superintendent and there would be no necessity to make any separate department?—A. He had an assistant Director.

Q. Would that not be sufficient instead of having two separate departments?—A. Of course they do to a certain extent overlap each other. I get enquiries for statistics and figures and so does the Director of Statistics.

Q. I myself cannot see how a man can compile statistics intelligently without learning some lessons from his work and if therefore the compiler of statistics were a member of the Commercial Intelligence Department those lessons would be properly used by the department. They could also be used by public firms and for reference purposes in answering questions. Surely there seems to be no special reason for splitting them into two separate departments?—A. At present the relations are more or less unofficial. They are very close.

Q. They might, but in personal matters they might become so close as to generate a certain amount of friction?—A. That is very largely a question of the personality of both officers.

Q. The present want of official connection does not encourage efficiency. I should have thought rather on the contrary that it suggests a possibility of friction. Is it your opinion that the two departments ought to be amalgamated?—A. I think there would have to be some re-organization. I don't think they could be amalgamated as they stand at present.

Q. That, of course, is only a matter of organization. One will have to be the head of the office?—A. There is a great difference between the two departments, in staff for instance. At present I have a staff of 14 clerks. My office work is very much the smallest part of the work of the department.

Q. In the statistical department is the office work practically the whole thing?—A. It has a very large staff indeed.

Q. You are not only Director-General of Commercial Intelligence but apparently a Director-General of Industrial Intelligence also. Are they to any extent different in character?—A. Yes, they are; except to this extent, that Indian markets are so widely distributed and often so remote from the Indian sources of supply that information regarding trade openings in such markets is practically commercial intelligence.

Q. The commercial side at present is so dominating that you do not notice the industrial side so much. Obviously the industrial problems most largely become technical and scientific?—A. I think that when we reach that stage in an enquiry, the enquiry should be handed over to a Director of Industries at once. Any purely industrial enquiry received by me is transferred to the particular Director of Industries concerned. Trade openings are, however, a different matter, and when I am asked by a manufacturer in Madras whether there are any openings for his wares in the Punjab I reply to him direct.

Q. There would in any case be a certain intelligent interest in mercantile and commercial methods in an industrial department. Of course one can understand that there is a good deal about each which is special. Would you like to amalgamate both?—A. As regards questions of market openings certainly, but not as regards industrial processes.

Q. At present the industrial side is either not cared for or only partly cared for. The fostering of a new industry in itself is nothing more than fostering its technical and scientific foundation?—A. That is the work of the Director of Industries.

Q. That really is not properly cared for?—A. That is quite true.

Q. About the commercial museum in Calcutta do you think it has done a great deal of good?—A. I think it has done good. It has done so specially in the placing of orders. Of course it did not start for that purpose. It started more or less as a sort of museum—a museum in which exhibits would be placed which would show the visitor what was being done in different parts of India in the matter of industries; the fundamental idea being that anyone who wished to invest capital would be able to see here what was being done in other parts of India and follow the lead.

Q. It has been suggested that the supply to the museum in a compact form of all the products of the various industries of India helps the foreign competitor as much as it does the swadeshi manufacturer?—A. Yes. We don't now show in the museum any foreign manufactured articles, only Indian goods.

Q. It has also been suggested that manufacturers do not get their information in that way and that a much more efficient way of helping the industries in India would be to form sales agencies. Are you in favour of sales agencies being organised by Government?—A. I think that it would be a sound thing if such agencies were provincial. It would be too big a thing to start a sales agency for the whole of India in one centre.

Q. Do you think the commercial museum would be more useful if it were situated, say, in the Harrison Road or somewhere where it is more likely to be better used by the Indian population?—A. Yes. I think it would. I think at present it is not very well situated.

Q. Mr. A. Chatterton.—I want to ask you about the sales agency. You have a considerable number of examples of swadeshi manufacture in the museum and in certain parts of the country there are depôts in existence which are at the present time confined to the sale of local manufactures and it has occurred to me that it might be advisable to extend the sphere of these depôts. There are depôts at Cawnpore, Bangalore and a larger one in Bombay. Would it be possible for this central museum to act as a sort of go-between between the Indian manufacturers and these local sales depôts? Would it not be possible for your central agency to bring to the notice of the local depôts any class of goods that manufacturers in other parts of the country are making and promote a spirit of exchange between them?—A. Yes. I think that could be done within a limited extent. I should like to see it done in two ways. Firstly by the interchange of catalogues directly between the sales depôts and secondly by reference to the catalogue of the commercial museum.

Q. I understand from you that there is a fair amount of business already being done through the commercial museum by getting a number of orders placed with particular firms who have sent exhibits. Have you any arrangement for keeping track of these commercial openings? Do you correspond with the people who exhibit in your museum and do you ascertain from them what business they have done subsequently?—A. Most of it is unsolicited. We get a number of letters from the firms saying that orders have been placed with them from visitors to the commercial museum.

Q. Have you compiled any statistics from that as regards the volume of business that is going on in this way?—A. It is not very big. I have got a list showing the attendance at the museum for December and part of January and the number of orders placed during that time.

Q. Those are initial orders that are so placed?—*A.* They are the only orders placed through me. The average attendance during December was 47 a day and during January it was 69.

Q. President.—When I was at the museum there was no such list?—*A.* I started it sometime ago and I took it up again in December.

Q. What were the orders placed?—*A.* 31 orders were placed during December, and January is rather a special month. There was a special order on the 9th of January for Rs. 2,170. There were altogether 34 orders in January. The average value of the orders is between 10 and 60 rupees or about 30 or 40 rupees a day. The total value of the orders placed during December is only about Rs. 200. It is typical of the ordinary daily work at the museum but as I say I got a special order in January for Rs. 2,000 odd and I have since got a still larger order for Rs. 3,000. An order of this amount is exceptional.

Q. Mr. C. E. Low.—You do not know anything of the orders placed direct with the manufacturer?—*A.* No.

Q. Mr. Chatterton.—Have you any reason to believe that there are such orders?—*A.* Yes.

Q. Are you in touch with the exhibitors and can you get from them a statement of the business that ultimately results? *A* man for example exhibits some knives and an order is placed for Rs. 5. If the knives are found satisfactory a subsequent order is placed for Rs. 500 direct. Have you got any knowledge of such transactions?—*A.* I know that such transactions are going on but I have not got the details.

Q. Would it be practicable for you to ask those who exhibit the goods in the museum to send you monthly returns of the business that they are able to do as the result of the exhibition of their goods in the museum?—*A.* I have made a note of that and we shall work up to it as soon as staff permits. In our future enquiries we will add a foot-note saying that if further business arises as a result of this introduction we should be glad to know it.

Q. You state in your note that it is well-known for example, that the most favourable conditions in which to extract vegetable oil in this country are still to be ascertained and that at present European temperatures are more favourable to the successful carrying on of the industry?—*A.* I am afraid I am not a scientist myself but I was going if I remember right on a report from which it was shown that the best results were obtained in England.

Q. Are there any difficulties connected with climate?—*A.* In obtaining the necessary consistency vegetable oils should not be too solid or too liquid.

Q. You say in your note that high prices abroad and high freights have encouraged the local manufacture of many articles which have been developed extensively since the war began. Do you make that statement with reference to the fact that the development of many of these industries is not of a permanent character? Are they the so-called mushroom industries or war industries?—*A.* I was thinking of galvanized iron works as a matter of fact. I could not call it a mushroom industry. It has developed very much lately on account of orders which had hitherto gone to England, but I don't think that they are making use of their bye-products.

Q. What do you mean by bye-products?—*A.* The chemical refuse obtained after the galvanizing process is finished.

Q. Is it not a fact that in some cases these people have been given the necessary stimulus to develop; that in the majority of cases they will be able to hold their own even if prices return to the normal conditions?—*A.* I should think they will in the majority of cases but it is very hard to say.

Q. Is it a case in which having once got hold of the market they will be able to retain the market?—*A.* It is very difficult to say whether they will be able to undersell foreign competitors after the war.

Q. President.—Are the costs now lower than the prices in pre-war times?—*A.* I cannot say off-hand. I should not think they are lower. I should think they are higher.

Q. Dr. E. Hopkinson.—If a manufacturer at home wants to know whether he can obtain any particular product in India, is it proper for him to apply to you direct for the information? *A.*—Yes.

Q. And you will be able to afford the necessary information?—*A.* Yes.

Q. If he were asking for example about a particular timber you will be able to give him the information?—*A.* Yes.

Q. Would your answer go to him direct or through the India Office?—*A.* It will go to him direct.

Q. If, on the other hand, a manufacturer in India wanted to ascertain whether there are any markets at home for his production or any purchasers in India, you may be able to answer from your own knowledge or take the necessary steps to ascertain and give the information?—*A.* If an Indian producer wanted to know whether he had any chance of getting markets for his goods in England, I would write straight to the Board of Trade. That is to say, if I do not happen to have the information myself, I pass on the enquiry to the Commercial Intelligence Branch of the Board of Trade.

* *Q.* And they would ascertain so far as possible and let you know?—*A.* Yes. That would be the case. A great number of the enquiries are enquiries for dealers in the United Kingdom.

I tabulate the lists which I receive and bring them up-to-date so that they can be used as often as the enquiries come up.

Q. Mr. A. Chatterton.—When you send the enquiry to the Commercial Intelligence Department, do they pass it on to the Imperial Institute?—A. I don't think so. The Board of Trade seems to get into touch with the manufacturers direct.

Q. Dr. E. Hopkinson.—Take a question of this kind. Supposing some flax is grown or some flax fibre is grown and one wants to know how to get a proper value for it, would you take up an investigation of that sort?—A. Yes.

Q. And you will deal direct with the Commercial Intelligence Department?—A. Yes.

Honble Sir Fazulbhoj Currimbhoy.—Q. You want a Board of Industries. Is the Director of Industries to be a local officer or should he be Imperial?—A. He should be an officer of the Local Government

Q. You say 'that the detailed powers of the Board are however matters which it is useless to discuss at this stage. The chief point which I would venture to emphasize is that the various forms of assistance which can be given by Government to individual concerns by scientific advice, by reduction of royalties, excise fees, railway freights, etc., are very numerous.' These are Imperial matters. How can the Local Board deal with them?—A. Railway freights are not an Imperial matter.

Q. What about the excise?—A. Excise is also a provincial matter.

Q. There are many other concerns in which one will have to deal with the Imperial Government?—A. If it were a concession which only the Imperial Government could give, the course would be the same. The Board would go up to the Local Government with their recommendation but instead of issuing orders itself the Local Government would, if it approved the recommendation, pass it on to the Imperial Government.

Q. Will that not delay matters? Take for instance the question of expert assistance. The Local Governments cannot give experts for all industries?—A. That is why I am suggesting a research institute with a Director of the Institute.

Q. You say that the Development Commissioner should control the Agricultural Department, and Co-operation as well as Industries in the province. Don't you think that agriculture is too big a thing and that the Director of Co-operative Societies has himself a lot to do?—A. The Commissioner would deal with it only as Chairman of the Board.

Hon'ble Pandit M. M. Malaviya.—Q. When did you join the service?—A. In 1905.

Q. How long have you held this appointment?—A. For a year.

Q. Did you have any special training in respect of your present appointment before you were appointed? Did you have any special training in connection with commerce before you took up this post?—A. My father was for many years in the Bank of Bengal, and that meant a commercial training in my home life.

Q. Apart from that capacity which you have inherited have you had any other qualifications for this office?—A. I have been Under Secretary to the Government of India and also to the Bengal Government—on both occasions in commercial departments.

Q. You speak here of the work which you have been doing. You have in the course of your tours visited factories and industrial concerns and you have tried to obtain information as to the difficulties which the manufacturers are contending against. Is that a part of your duty as Director-General of Commercial Intelligence?—A. That is incidental to my tours. For instance I get enquiries from the Army Department of the Government of India. They ask me whether I know of any supplies of tinned fruit for the use of the troops in Mesopotamia and I am anxious to see that as much as possible is done to meet the demand.

Q. Is it part of your duty to go out and see what difficulties particular trades are contending against and to try to solve those difficulties?—A. I took that up specially for the purpose of this Commission. The chief part of my duty is to answer commercial enquiries.

Q. Enquiries as to what raw products or manufactured products are available, enquiries relating to rates, freights and markets?—A. Enquiries from shippers as to where they can obtain particular commodities which they require.

Q. Is it also part of your duty to find out what difficulties industries are contending against and to endeavour to suggest solutions?—A. I should not think so. That is more particularly the duty of the Director of Industries. If I receive such enquiries I refer them to the particular Director of Industries.

Q. Do you travel in all parts of India to gather information and to find out what difficulties industries are contending against?—A. I cannot say that I travel particularly for that purpose.

Q. You take that up as part of your work?—A. Yes.

Q. How do you encourage industrialists in solving their difficulties? Do you correspond with any technical experts of Government?—A. Yes. I correspond for instance with Pusa, the Agricultural Adviser. I correspond also with the Tinctorial Expert at Madras, and with other scientific experts.

Q. Do you help these trades, by being the means of communication, between them and the experts to solve their difficulties?—A. No. I usually put the enquirer direct on to the

expert. For instance I got an enquiry the other day about pulp in Madras and I was able to refer the enquirer directly to the expert in Madras.

Q. Are many difficulties referred to you by correspondents apart from what you may gather in your tours?—A. Yes. They are mostly of the nature of asking for reductions in railway freight in which I cannot be of very much help.

Q. Except as Director-General of Commercial Intelligence have you given any particular study to the history of the growth of trade and commerce in other countries? Have you made any study of it?—A. That has always been a hobby with me.

Q. Have you studied the growth of commerce and industry in Japan and the United States?—A. Yes.

Q. You say here that India is primarily an agricultural country and that the natural bent of the people is agriculture. Do you know what the percentage of raw exports from Japan was 20 or 30 years ago and what it is now?—A. I should think it was then very big indeed.

Q. You have said that agriculture is the primary industry of India?—A. Yes. Even now 75 per cent. of her exports are represented by raw products.

Q. Would you say that Japan was also an agricultural country primarily?—A. Yes.

Q. You say that the natural bent of the people is agriculture and that to stimulate the development of Indian manufacturers is indeed from some points of view distinctly dangerous. I want to understand where the element of danger comes in stimulating the Indian manufactures, and for that reason I want to know whether you have really studied the conditions of Japan and India and compared them?—A. I should think that the state of the manufacturing industry in Japan is a distinctly dangerous model. Japan is just the country that affords an example of the dangers of over-rapid development.

Q. Where do you think the element of danger comes in?—A. You have had in Japan an unhealthy stimulus—an artificial stimulus. The result has been a very great deterioration of quality.

Q. Have you been to Japan?—A. No.

Q. You are speaking about deterioration of quality?—A. The Japanese Government have recently instituted a censorship of all exports from Japan just to make an attempt at keeping their quality up to standard.

Q. We have been told that the Japanese manufacturer makes a better class of goods for his own use and sends out the worse class of manufactured goods to other countries. Therefore you should not easily assume that all their manufactures are as bad as the samples that are seen here. As you have not been to Japan you cannot say whether their manufactures are really so nasty as they are represented to be. Can you?—A. I can only judge by samples.

Q. What have you to say about their ship-building industry and their munitions? Do you think they have not done well in that direction?—A. I don't think so to judge from the reports that one receives of the criticisms of Russia regarding the manufacture of munitions by the Japanese. That is after all the most independent view one can get.

Q. Do you know that they have built up a very great manufacturing industry during the last 30 years and that they have prospered very much. The national wealth has gone up. Is there anything in the conditions of India which you can mention which will stand in the way of similar progress being achieved in India?—A. I think one of the greatest obstacles is distance by railway.

Q. That may be a disadvantage. Is there anything which stands in the way of India developing into a great manufacturing country? You have got the raw materials and the labour and the market?—A. Everything depends on prices.

Q. Has not India a large home market of its own?—A. Yes, but there are the difficulties of distance and climate.

Q. You say climate is one of the difficulties. Don't you know that we already have many big manufacturing industries, for instance, sugar, indigo, railway construction and now munition making. All these are flourishing. Is there any reason that India should not develop further in all these directions?—A. No.

Q. Climate will not stand in the way of developing in these directions?—A. No.

Q. Of course in some cases climate may be an important consideration. Some things might be done better in colder climates, but for that reason you cannot say that the climate of India offers an obstacle to the development of Indian manufactures generally?—A. Of course there are only some cases where climatic conditions need be considered. I do not think climate has a bearing on all industries.

Q. You say that Indian labour has yet got to be educated. Labour has got to be educated in every country which wishes to develop manufactures. Don't you think that problem can be solved?—A. That can be solved in the course of a period of years.

Q. You say that "indigenous capital is already actively employed in agriculture and that business organisation which is essential for manufacture on a large scale is at present lacking with the result that capital does not easily come forward readily to support indigenous enterprises." Has that not also been the experience of other countries which have now developed into big manufacturing countries? Don't you think that also could be got over

by the spread of business education?—A. I quite agree with you there. My only point is that it must take a period of years. It must be a long time. It was thirty years in the case of Japan and Japan is only one-tenth of the size of India.

Q. Do you think that in 30 years you can bring India to the level of Japan?—A. I quite agree that you can do that in 30 years in the case of a country which is only one-tenth of India.

Q. But then India has ten times as great resources as Japan has and the vastness of the country is also an advantage?—A. I think it makes organisation all the more difficult.

Q. We have got the necessary raw materials, the labour and the markets. We have also a strong system of administration. The Japanese have not the advantage of the Indian Civil Service?—A. No.

Q. We are an ancient country with a great industrial past. If the Government in this country took steps similar to those the Japanese Government took, don't you think that it is possible to accomplish the industrial regeneration of the country?—A. It is possible.

Q. Then you agree that the difficulties that you have mentioned can be got over and that progress in manufacturing industry can be made both rapid and satisfactory?—A. Certainly satisfactory, but not too rapid. That is where the danger lies.

Q. The Government is not satisfied with the progress that has been made and it wants to make greater progress. This Commission has been appointed to advise how progress can be accelerated? A. It is an index of what can be done in the future.

Q. The last difficulty that you mention is that of competition from overseas producing manufactures on a large scale and dumping their goods in this country? Have you any suggestions to make as to how to fight against this difficulty?—A. I suppose there is nothing that will prevent the foreign competitor from marketing his goods at a lower price here than he sells them for at home.

Q. Because of the subsidies?—A. Because of the protective tariffs and the subsidies. He can get a high rate of prices in his own country.

Q. Have you no remedy to suggest in order to give the indigenous manufacturers a chance?—A. I know of no remedy except that of tariffs.

President.—If you start an industry you will find that if you cannot start it on a scale that will attempt at introducing the very best economies then you cannot be on a par with the foreigner. If you have got a plant for instance which is designed to produce 100 tons a day you cannot produce 50 tons a day with regard to economy. If the local consumption is only 50 tons you have got to dispose of the rest of the 50 tons somehow, even below cost price. You cannot prevent dumping in that case.

Hon'ble Pandit M. M. Malaviya.—Q. You think then that the only remedy is tariffs, apart from what the President has been good enough to explain?—A. I would by no means prevent competition. What I say is that unfair competition should be prevented. I am in favour of healthy competition.

Q. Have you then any remedy to suggest to help the indigenous industry to establish itself?—A. The obvious remedy is to encourage the local manufacturers so as to enable them to compete.

Q. You say in your note that what the State is required to do is not to find the capital itself but to encourage the conditions in which capital is attracted to manufacturing enterprises. What is the way in which the State can help to attract capital. Do you think that Government should guarantee interest or dividends?—A. The remedies that I suggest are indicated in paragraphs (c) and (d).

Q. You are not in favour of Government guaranteeing interest on the capital invested?—A. No.

Q. Are there not precedents which show that the Government has helped industries by guaranteeing dividends, for instance, the railway industry? Don't you think that the same principle might be applied to some other industries?—A. I think that is a special case.

Q. You do not think that the same principle could be applied to some other select cases?—A. I do not think you would secure the object which you have in view.

Q. If Government decided to guarantee interest in any case will it not make a proper and full enquiry before it will give a guarantee? The question is whether you are opposed to the principle of it?—A. I am opposed to the principle.

Q. With regard to the Stores Rules, in your note you say "There are two directions in which I would be glad to see existing rules improved. In the first place, I think that it would be an excellent thing if branches of the best British firms were encouraged to settle in this country and stores usually indented from home were imported through them." You said a little while ago that you are not opposed to healthy competition. Would you shut out articles manufactured in other countries and give preference to articles manufactured in England, or would you let firms of other nations also compete?—A. I am in favour of free competition.

Q. Would you allow American and German firms also to compete?—A. There is at present no prohibition.

Q. I am speaking of the future?—A. From the industrial point of view I would allow all to compete. From the political point of view the answer will vary.

Q. Are not the two intermingled? They are not quite independent?—A. I think they are different aspects of the same thing.

Q. You say that the purchasing officers in this country should have full discretion to purchase through the Stores Department or direct. You say that this is very much the system adopted by the self-governing Colonies. Have you studied their systems?—A. They buy through their agents or not as they choose. They do it in Australia and I believe the same is the case in Canada. I am talking only of the self-governing Dominions.

Q. Have you studied the system on the spot so as to be able to say what the local feeling is on the subject, whether it is regarded as a sound system?—A. I cannot say what the Australian opinion is about it.

Q. You are in favour of it because in the abstract it appears to you to be a good system?—A. It seems to me that the purchasing officers are men of experience and that their experience ought to be trusted in the matter.

Q. Do you think they possess the technical knowledge which they should have in order to decide whether an article should or should not be purchased?—A. They certainly have the knowledge.

Q. You do not apprehend bad dealing?—A. No.

Q. You say under "Financial aid" that you are of opinion that any form of direct subsidy should be avoided and that the assistance given should be general, by technical instruction, advice, etc. Would you also be in favour of Government extending banking facilities?—A. Banking facilities would be dealt with under the same head as the proposal that Government should guarantee interest. I would deal with both on the same principle.

Q. Are you in favour of Government extending banking facilities to trade? Do you think there is need for it?—A. I have not studied the subject.

WITNESS No. 190.

THE BENGAL CHAMBER OF COMMERCE, Calcutta.*Bengal Chamber of
Commerce.*

* WRITTEN EVIDENCE.

Q. 1.—The Committee of the Chamber believe they are correct in saying that, when conditions were normal, the members of the Chamber experienced no difficulty in raising capital for industrial purposes, provided that the industry was sound, and the particular enterprise was being floated under well-established auspices.

Q. 2.—In Calcutta the sources from which capital is drawn for enterprises with which the members of the Chamber are connected are mainly two-fold:—

- (1) European sources in India; and
- (2) The United Kingdom.

In addition to these there are numerous enterprises, such as oil and flour mills, jute presses, soap works, etc., which are under Indian control, and the capital in which has been derived almost entirely from Indian sources.

Q. 4.—The Committee of the Chamber have no experience in this connection, except as regards light railways. In these cases ordinary joint-stock companies have been guaranteed interest on their capital for a certain fixed period.

Q. 5.—Dealing with the various alternatives in the order given the views of the Committee of the Chamber may be summarised as follows:—

- (1), (2) and (3). They would be on general grounds adverse to grants-in-aid, but if it should be considered to be advisable at any time to give such form of assistance, they are distinctly of opinion that it should be limited to the period of the experimental stage of the industry to be assisted. The plan of guaranteed dividends for a limited period has been successfully adopted in the case of light railways; and it might perhaps be extended to other projects of a similar nature.
- (4) Government loans might also be useful, the Committee think, while an industry is in the experimental stage, but they ought certainly to bear interest. For if they were granted without interest applications would be made on account of schemes having no prospect of maturing profitably, with the result that the loss would be borne not by the promoters but by the Government.
- (5) The Committee would be generally against the idea of the Government supplying machinery and plant on the hire-purchase system.
- (6) The Committee do not think that the Government should become a shareholder in a company. Its assistance should be, in their opinion, restricted to some form outside direct participation in the share capital.

* For the Chamber's views on questions 89 and 90, see additional written evidence printed in continuation.

- (7) There would be no objection, the Committee think, to the Government guaranteeing to buy, for a limited period, the products of an entirely new industry. But there would be, they consider, the strongest possible objection to the purchase, with public funds, of the products of any particular factory, if such factory were in competition with other concerns established and maintained by private enterprise.

Q. 6.—The control should be exercised by a Government auditor and a Government director. The latter should not take part in the actual management of the concern, but should be kept informed of its affairs, and should be able to advise the Board. The auditor should be not an officer of Government but an approved firm of Chartered Accountants.

Qs. 7 & 8.—The Committee of the Chamber have no experience of Government pioneer factories. They would, however, favour Government starting factories in a new industry on the understanding that as soon as the results indicate that there is a reasonable prospect of the industry being carried on satisfactorily the Government aid should be withdrawn. For example they think that a pioneer tanning factory might be established in Bengal: it should be worked on the most modern methods, and be managed by first class experts. Care should be taken when the pioneer factory is being established to ensure that it does not in any way overlap existing private enterprise. The Committee would be also distinctly opposed to converting successful pioneer State experiments into permanent State enterprises.

Q. 10.—The conditions prevailing in Calcutta are such that the banking facilities have always been found to be adequate. Any sound proposition that is put before the banks or financial houses is always sympathetically considered.

Qs. 11 & 12.—The Committee believe that co-operative societies would be most useful in the distribution of the following commodities, coal and coke, agricultural seeds, agricultural implements, and manures. It has been reported to them that one great difficulty in most of the industries in India is the proper organisation of adequate distributing facilities; and that few industries can afford to establish selling agencies all over the country for the one particular commodity produced. By the establishment of co-operative societies which would distribute many commodities this difficulty would be overcome. Co-operative societies might usefully take up for instance the retailing of coal to the populace in the United Provinces, and other provinces, in which wood and dung fuel are now being used.

Q. 13.—The Committee would be opposed to Government competition in existing industries. Government should, in their opinion, give assistance in the way of expert advice, etc., rather than compete with private enterprise in any existing industries. And in all cases due enquiry should be made before Government think of entering any particular industry.

Q. 14.—In the opinion of the Committee each case must be judged on its own merits.

Q. 15.—It is known to the Committee that the Geological Survey of India and the Government Research Institute at Pusa have given technical and scientific aid to industrial and agricultural enterprise. The scientific department of the Indian Tea Association, which is supported financially by the Government of India, also seems to them to be an example of how technical assistance may be given to industries.

Q. 17.—In the case of the scientific department of the Indian Tea Association the tea estates contribute towards the cost, and in like manner if there are other industries desirous of obtaining advice from Government scientific experts they should be required to pay fees.

Q. 18.—The results of the researches ought not to be published except with the approval of the owner of the private business, particularly if he has paid any fee in connection with them.

Q. 21.—The experience of the Chamber is limited to the assistance which has been given recently by the Imperial Institute in the matter of the hide trade. The Committee believe that the institute has been successful in directing the attention of British tanners to Indian hides. Such assistance, if it can be afforded in other industries, would appear to be advantageous to India.

Q. 22.—It would appear to the Committee to be advantageous to provide for such research for many scientific experts who would not be likely to visit India would be available in the United Kingdom. Research regarding the extended use of Indian products, such as jute, hides, etc., would be probably more successfully undertaken in the United Kingdom than in India.

Q. 23.—The only suggestion which the Committee can make in this connection is that the results obtained in England and in India should be interchanged.

Q. 24.—In the opinion of the Committee such supplementary surveys are required, as the information available surely cannot be complete. In point of fact in private enterprises surveys are constantly being undertaken in connection with developments in various fields.

Q. 28.—The Committee believe that a fully developed system of commercial museums would be of advantage. The promotion of such museums is, in their opinion, distinctly a step in the right direction. The museums in the presidency towns should be open to the public daily from 9 A.M. to 6 or 7 P.M. For with the openings confined to business hours it is a matter of some difficulty for business men to take full advantage of the museums.

Q. 29.—They might be in the first place established in the presidency towns and principal industrial centres, and thereafter gradually extended to the smaller towns.

Q. 34.—Trade representatives are probably not necessary in Great Britain, but India should certainly be represented by trade representatives in foreign countries and also probably in the Colonies.

The trade representatives should be Government servants, of the same class as the Civil Service, attached to the British Consulates, and before being appointed to foreign countries they should be trained by being attached to the Commerce and Industry Department in India, and should be given every opportunity of studying the trade and industry of India.

It would probably be exceedingly difficult to get business men of sufficient experience and standing for this work, and it is important that they should be independent.

Their duties would be to watch the development of any industries in the foreign country, prejudicial, or of benefit, to Indian trade, to report on imports from or exports to other countries which could be imported from or exported to India, to assist merchants in the foreign countries to get into communication with merchants in India, to report on methods of encouraging or assisting agriculture, industry or commerce in the foreign country which might with advantage be applied to India, and generally to keep India, so closely in touch with the agriculture, industry and commerce of the foreign country that India would be at once aware of any possible change in the current of trade and would be able to take advantage of the same.

Q. 35.—It appears to the Committee that it might be desirable in some cases to appoint temporary Commissions for special enquiries. —

Q. 36.—It does not appear to the Committee to be necessary for such appointments to be made : the enterprise of traders should be sufficient to deal with internal conditions.

Q. 37.—The lists might be published in the *Indian Trade Journal* ; and samples might be made available in the commercial museums.

Q. 39.—So far as the mofussil is concerned by the development of co-operative credit societies.

Q. 41.—Difficulties connected with titles at times constitute a serious check on industrial development. Instances have arisen in which good coal properties cannot be opened up, as exploiters are unwilling to take the responsibility attaching to titles which no solicitors will pass as sound.

Q. 46.—The Committee are without special knowledge or experience of this matter. They have however been permitted to examine the system which is in force on the Bengal-Nagpur Railway, and concerning which the Chief Mechanical Engineer of that line is submitting evidence to the Commission. This system appears to them to be valuable, and to be worthy of close consideration.

Qs. 56—67.—In reply to these questions the Committee desire to say that in their opinion a Director of Industries should be appointed for each province.

It would be, they fear, a difficult matter to establish Boards of Industries in each province as business men would not be able to spare the time necessary to serve upon them.

The Director of Industries should be an officer of the Local Government, and it would appear to be highly desirable that he should be a man with expert industrial and commercial knowledge and experience. The Committee fear however that the remuneration which a really able man with this experience would expect would be greater than could be offered. It seems to them therefore that the best arrangement would probably be for the appointment to be held ordinarily by an Indian Civil Servant. In order that too frequent transfers, and the selection of inexperienced men, might be as much as possible avoided some such arrangement as is in existence in respect of the Customs Service might be made.

For scientific and technical advice there might be established an organisation of experts subject to the control of the Imperial Government.

The services of these experts might be loaned to the Local Governments, and when deputed to a Local Government in this way the experts should be subject to the control of that Government.

There might also be experts in the service of the Local Government for work in connection with industries in which the particular province may be interested. These experts would be subject to the control of the provincial Director of Industries.

Q. 94.—The Committee are of opinion that the existing Indian law relating to trade marks and descriptions is satisfactory and sufficient. They have no suggestions to offer for its amendment. And they would be opposed to any legislation requiring trade marks to be registered.

Q. 96.—The Bengal Chamber of Commerce has for many years past strongly urged the introduction of a law requiring the registration of partnerships. But the Government of India, while viewing the proposal sympathetically, have been deterred from undertaking legislation by reason of the admittedly difficult legal questions with which it is surrounded.

Qs. 97—99. (a) In connection with these questions the Committee quote the following resolution which was unanimously adopted at a special general meeting of the Bengal Chamber of Commerce, held on the 3rd May 1912 :—

“Whereas it is expedient and desirable, in view of the great administrative changes which are now being undertaken, and their probable effect on the development of

the trade and commerce of Bengal, that the question of the continued application to all Indian railways of uniform minima mileage rates should be reconsidered ;

“ Resolved that the members of the Bengal Chamber of Commerce strongly endorse the protest that they made, against the continuance of this system, in their letter, dated 12th September 1905, to the Government of India, and that they re-affirm their conviction that the device of uniform minima mileage rates ignores the natural advantage attaching to any particular line of railway ; that it presses with undue and unnecessary severity upon the eastern ports, such as Calcutta, which are served by railways working at low cost, inasmuch as it forces these railways to charge needlessly high rates of freight ; and that it consequently gives an unfair and unjustifiable preference to the western ports, which are served by railways working at high cost, but which enjoy lower rates of sea-freight to Europe.”

(b) A most important and pressing railway extension in Bengal is that of the conversion to standard gauge of the existing metre gauge line from Santabar to Siliguri. This has been most strongly urged by the Committee as being an immediate necessity if the trade of Northern Bengal is to be properly developed.

(c) The provision of a bridge at Mokameh Ghât to connect the Bengal and North-Western Railway and the East Indian Railway is another urgent transport necessity. It is true that Mokameh is not in Bengal, but the bridge is intended to facilitate the interchange of traffic between the United Provinces and Tirhoot and Calcutta. The Committee urged the proposal upon the attention of the Government of India in a letter, dated 8th April 1909 ; and they understand that the need for a bridge is admitted. It is not of course expected that the project can be financed during the war ; but on the cessation of hostilities it ought certainly to be regarded as of urgent importance.

(d) Another recommendation which the Committee of the Chamber wish to make as regards transport facilities is that the management of the Oudh and Rohilkhand Railway should be transferred from the State to the East Indian Railway Company. The Oudh and Rohilkhand Railway consists largely of branches taking off from the East Indian main line ; and it has junctions with that line at numerous points. To work economically and effectively, by a separate management, a line so situated is admittedly very difficult. And the financial results of the working of the Oudh and Rohilkhand Railway suggest that it could be more successfully and economically managed if it were merged in the East Indian system. The Committee of the Chamber represented this view to the Government of India in a letter, dated 27th June 1912. They showed that during the decennial period 1902—11 the State had sustained a net loss of Rs. 26 lakhs on the working of the Oudh and Rohilkhand Railway. They also quoted figures of the proportion of working expenses to earnings. This proportion had varied in the decennial period from 48·16 per cent. (1903), the lowest point, to 72·76 per cent. (1909), the highest point, as against 44·90 per cent. and 38·25 per cent. highest and lowest points on the East Indian Railway. For the year 1914-15 the percentage on the Oudh and Rohilkhand Railway was 56·71 and on the East Indian 38·16. These statistical results show that a strong case has been made out for the proposed transfer of the line.

ADDITIONAL WRITTEN EVIDENCE.

Copy of letter No. 879, dated 27th March 1917, from the Secretary, Bengal Chamber of Commerce.

I am directed to refer to your letter, No. 2546, dated 5th January 1917, and your demi-official, No. 2555, of the same date, in which you ask to be furnished with the views of the Chamber on questions 89 and 90.

2. You drew the attention of the Committee to the following remarks which were made by Mr. J. B. Lloyd of Messrs. Shaw, Wallace & Co., in the course of a written statement submitted by him to the Commission :—

“ It would undoubtedly facilitate the business of shippers if Government certificates of quality and weights were enforced and had to be accepted by buyers. When claims are made at buyers' ports, the shippers have to pay on the c.i.f. price of the goods, which in certain cases is very considerably greater than local value. Also the shippers have to wait for some considerable time before they know if there is any claim on their shipments which, in some cases, may prevent them from entertaining further business in the meantime. Government certificates could probably, with advantage, be enforced for the commodities which are shipped in large quantities from Calcutta, such as jute, gunnies, rice, wheat, and linseed, but I doubt whether it would be possible for Government to arrange to grant certificates for the two latter commodities, unless some system of bulking the stuff could be arranged in Calcutta. It would be necessary for such certificates to be compulsory, or some shippers would continue to offer buyers on the old terms, and this would tend to oust shippers who might only be willing to do business on Government certificates.”

3. The Committee of the Chamber placed the questions, together with Mr. Lloyd's remarks, before the members, and also before the various mercantile associations interested. In response to a request for opinions the Committee received a number of communications, the general purport of which is distinctly unfavourable to the proposal for the establishment of Government certificates of quality. Taking the staple commodities specifically referred to by Mr. Lloyd, I am to say that, as regards jute, the Baled Jute Shippers Association has

definitely expressed the opinion that the proposal would be unworkable. The Jute Fabrics Shippers Association has said that, so far as the export trade in jute manufactured goods is concerned, the idea is impracticable owing to the enormous number of inspections that would be required: These inspections would have to be made at the mills, where appliances are available for checking weights and measurements; and as the mills number more than forty it is obvious that a large staff of experts would be needed. The Association has also pointed out that no certificates granted in Calcutta would necessarily bind the buyer at the port of destination; and unless he could be so bound by it, which is very doubtful, the certificate would be of no value.

4. Wheat is exported from Calcutta in small quantities only; and the Calcutta Wheat and Seed Trade Association suggest therefore that Karachi—which is the principal port of exportation—should be consulted. As regards linseed, the Association is of opinion that no good would result from any scheme for Government certificates of quality and weight.

5. The rice trade is not represented in Calcutta by any organisation or association, but judging by the replies which have been received from members of the Chamber it would appear that shippers do not favour the proposal. Members interested in the hide export trade have also condemned it, on the ground that a Government certificate would mean nothing to the buyer unless Government standards were likewise established. The various shippers have at present their own standards, and obviously a Government certificate testifying that a particular shipper's hides were up to his standard would be of no value. There would be also practical difficulties in the application of the scheme to the hide trade, as under present conditions each particular hide, or skin, as the case may be, is selected before baling.

6. The foregoing paragraphs summarise the opinions received and they show that, as regards the export trade generally, the idea is considered to be impracticable. The Committee agree with this view, as they think that the staple exports from Calcutta are not readily adaptable to any such scheme. There would be practical difficulties in the way of arranging for the issue of the certificates; distant buyers also would be naturally reluctant to relieve their sellers of any responsibility; and it is apprehended that the system might tend to promote speculation which both the Government and the trade are of course anxious to avoid.

In your letter you also refer to question 91. The fear was expressed by Mr. Lloyd that adulteration may in the future be practised in the trade in fertilisers. At the present time this trade is in an early stage of development, and there is not much scope for adulteration. But it has been pointed out by members of the Chamber, as well as by Mr. Lloyd, that at present there is no regulation in India to prevent a dealer from selling anything as a fertiliser. Nor are there any regulations fixing standards, or limits of error, in the analysis of fertilisers. In Great Britain the Fertilisers and Feeding Stuffs Act of 1906 compels the seller to certify his products, and to give a guarantee. The Act also empowers the Board of Agriculture to fix limits of error for both feeding-stuffs and fertilisers. It was suggested by Mr. Lloyd that an Act on similar lines might be introduced into India; and other members of the Chamber interested in fertilisers have supported the suggestion. The Committee think that the proposal is one which might be carefully examined by the Government, and that the question of legislating might by seriously considered. As regards the application of question 90 to fertilisers, it has been recommended that instead of appointing official analysts the Government should empower approved public analysts to make analyses under the Act at certain fixed charges.

Copy of letter No. 955, dated 10th April 1917, from the Secretary, Bengal Chamber of Commerce.

In continuation of my No. 879, dated 27th March 1917, I am now directed to hand you, for your information, the accompanying copy of a short report on the Philippine system of grading hemp. This report has been compiled by one of the largest shipping firms in Manila, and has been communicated to the Committee by a member of the Chamber.

Philippine system of grading hemp.

Grading of hemp under Government control came into force on 1st January 1915. There are 20 Government grades and the various baling establishments are permitted to register their own private marks for each grade but every bale has to be stamped before being exported with the Government grade as well as carrying the private mark. Baling establishments are visited daily by Government Inspectors; the time they spend at any one warehouse depending on the amount of work being done there. In this manner Inspectors keep some sort of general control over the classifying and grading done at each establishment; besides this before granting certificate of inspection and grading of any parcel inspectors draw at random 2-3 bales of most marks in a lot to be opened and examined. Bales found incorrectly graded have to be reclassified and repressed at the expense of the establishment. Inspectors have on occasions ordered whole parcels or all the bales of one grade in a parcel to be repressed on account of improper grading. Government can cancel the license of an establishment for consistent bad grading or false packing.

• Hemp from points at which the trade not large enough to maintain Inspectors is brought either to Manila or Cebu to be examined and graded by Government Inspectors.

License for baling establishment costs, P25 to P1,000 per annum according to the number of bales pressed and charge of 10 centavos per bale pressed is also payable as inspection fee.

Result of Government control has certainly been to produce more regular classification and hemp is sold to London now-a-days with no further guarantee as to quality than that given by the Government certificate. Exporters of hemp to America however have still to give their personal guarantee as to quality in order to do business and it is very doubtful if American buyers will ever get sufficient confidence in Government classifying to buy without other guarantee as to quality than the official certificate.

The London market takes mostly the coarsest and lowest grade of hemp which is undoubtedly the easiest quality to maintain uniformly classified. The American market requires medium to high grade and apparently require more precise information as to quality of fibre than is given by Government certificates.

The quality of fibre cleaned has not, in our opinion, been improved by the operation of the new law. As in the past grade of fibre cleaned by the natives is largely dependent on values. When the margin of difference in values of high, medium and coarse is small poor fibre is cleaned as it is more easily made and a larger quantity obtainable; as the value of coarse fibre declines or the value of fine advances and the difference between selling prices of high, medium and coarse gets larger, so does the quality of fibre produced improve.

In our opinion whilst the operation of the law enforcing Government inspection has not yet achieved all that was desired it has undoubtedly produced many good results at not a heavy cost.

NOTE.—The Bengal Chamber of Commerce did not give oral evidence.

WITNESS No. 191.

Hon. Mr. C. H.
Bompas.

HON'BLE MR. C. H. BOMPAS, B.A., I.C.S., J. P., Bar-at-Law, *Chairman of the Calcutta Improvement Trust, Calcutta.*

WRITTEN EVIDENCE.

I venture to call the attention of the Members of the Industries Commission to a matter relating to the industrial development of the country, which I submit is deserving of their attention. When after the invention of the steam engine, the great industrial movement set in England there was a great influx of operatives to the towns. Owing to defective sanitation, and want of arrangements, for proper housing, these operatives lived under most deplorable conditions; and probably no class of the population, at any time in the history of England, was ever so steeped in disease, degradation and crime, as the operative classes in some of the manufacturing towns in England in the middle of the nineteenth century. Even at the present day when vast improvements have been effected, the physique of townspeople is unsatisfactory, and the town population would tend to die out, if it were not constantly receiving recruits from the country.

If there is to be large industrial development in India, it would be wise to take steps to avoid those concomitant evils, which experience shows to exist. Apart from humanitarian considerations it pays to have a healthy and contented labour force, and not only good housing but also those external advantages which town planning aims at securing are necessary to secure this.

I suggest that it ought to be made a condition of Government help or support being given to any industry, that provision should be made for accommodation for the labour force—whether by the employer or by local authorities of a thoroughly satisfactory type, and that in selecting the site of any new industrial undertaking, consideration should be given to its suitability for development, as a place of residence for the labour force.

NOTE.—Hon'ble Mr. C. H. Bompas did not give oral evidence.

WITNESS No. 192.

Mr. J. H. H.
Rolfe.

MR. J. H. H. ROLFE, *Messrs. Rolfe, Morris & Co., Mechanical, Civil, Mining and Consulting Engineers, Calcutta.*

WRITTEN EVIDENCE.

Capital.

The want of initial capital in a large number of cases has deterred the development of many industries which would have otherwise been valuable assets to the country.

In a large number of cases adequate capital has not been subscribed owing to distrust among the organisers and subscribers.

Where the European element has been supreme many industries have been developed successfully. I would draw special attention to the following :—

- 1st. It is recognized that capital is available in India from Europeans and Indians if safe investments can be found.
- 2nd. Foreign Governments help their subjects to trade in India to the detriment of British subjects, and the Britisher is not supported by his Government even when it comes to a choice of purchasing from Britisher or Foreigner.
- 3rd. To make an industry a success it is necessary that the demand should be as great as the supply and the production rate capable of competing with the imported article.
- 4th. Investors should be given some guarantee that they will receive the support of Government after the war when it comes to competition with foreigners.

I think it is a fairly well established fact that raw materials exist to such an extent Minerals. that India could, in many cases, be independent of other countries for importation. Without doubt considerable scope exists for development and the absence of support and no facilities offered by Government, has been in many cases the deterrent feature. Manganese ore is a case in point. It was due to the failure of Russia to meet the Continental demand that India was in a position to develop its resources. In a few years manganese mines were opened out in India and with low steamer and railway freights it was found that Indian manganese could be shipped to Europe at a profit. Both Europeans and Indians were ready to invest their capital. When Russia was again able to export, prices fell and a large number of those who had invested money in their enterprise had to close down their mines and sustain a financial loss. Fifty per cent. of those left in were foreigners, who reaped the benefit and maintained their position by being assisted by their Government, and there is no doubt that the large quantity of manganese they were able to export under these conditions, has helped the German Government in particular, to strengthen its hands in the present war. These foreign firms by the profits they made by the assistance of their Government, were able to establish agencies in London and were able to compete with the Britisher in his own country and sold Indian manganese ore to the British Government and the British manufacturers.

Taking this as a specific case, it clearly demonstrates that India was willing to find and invest capital and if the British Government had been in a position to step in and assist those who had come forward with such capital, the loss to a large number of investors would have been minimised.

There are at present other minerals which India can produce but the investor is backward to lay out money on the chance of making a profit during the war to stop when the war ends.

To make this more clear we give a specific case.

We have now a project in view of preparing graphite for the local market. We have Graphite. secured our supply of crude graphite and to make it marketable will necessitate our putting down plant at a cost of Rs. 30 to 40,000. As long as the war lasts we can continue the business and make a profit, but we are doubtful what the position will be after the war. The question is, are we to invest this money with the off-chance of having to close down after the war, owing to the home supply being put into India at lower rates.

This is difficult to procure in India and if it can be obtained, the fees are usually so heavy that it cannot be availed of. Want of expert advice.

Experts should be available for each industry and the fees regulated so that all can avail themselves of the opportunity.

My firm has already gone into this question with the Chamber of Commerce and at their suggestion, I have placed these views before the Industrial Commission. I can only Railway freights. again add, that if the mineral trade of India is to be developed, railway freight will play a most important part in its success. I attach some correspondence which my firm has had with the Bengal Chamber of Commerce on this subject.

What is absolutely necessary is a low and uniform rate for minerals over all railways in India.

I have directed my attention to the utilization of forest products for paper making and Forest the production of fibre. My experience has not been very encouraging from any help given by the Provincial Governments. I quite understand the reluctance to give promiscuous concessions, but on the other hand no firm or syndicate can be expected to place a large capital in any industry dependent on local supplies unless some fixed areas are granted and the investing firm protected to some extent.

I am strongly in favour of industrial banks being established in each Presidency.

Industrial banks.

These banks should be limited and capital subscribed by the Government and public. The directors should be chosen from leading commercial men and Government appointed officials.

The banks to have power to encourage approved industries and such industries requiring financial assistance and while such assistance is being given they should act as managing agents to the concern.

The bank should maintain its own staff of experts and their advice should be available at reasonable fees.

I am not in favour of direct Government assistance. This would lead to red-tapism and consequent delay in settling the point under enquiry, which no business can stand.

The industrial banks on the other hand, if worked on my suggestion, would act promptly and the directorate being partly commercial men would understand more readily which schemes are worth financing.

Also, having control as managing agents, the bank would have the opportunity of seeing that the scheme is being worked economically, of securing the best advice, and of finding a market for products.

These banks would in time control the sale of products in India and receive greater assistance in finding markets than the individual concern, and would soon become a power in the industrial world.

No. W.-398, dated the 26th May 1916.

From—MESSRS. ROLFE, MORRIS AND CO., Calcutta,

To—The Secretary, Bengal Chamber of Commerce, 20, Strand Road, Calcutta.

FREIGHTS ON MINERALS.

The development of mineral industries in India has been active during the war, and although large supplies of the raw materials are obtainable in India the high railway freight charged on these minerals to carry them to sea-board is so excessive that business is debarred.

2. Certain minerals, such as coal and manganese, owing to large quantities carried, have been considered, and railways have fixed uniform rates that allow of large development.

3. Certain minerals have been neglected by the railways as far as freight towards the sea-board is concerned owing to such minerals being imported in the refined state from Europe before the war. One instance we quote is graphite.

The supply of graphite to India before the war was controlled by a London syndicate and the local graphite was a neglected commodity. Owing to imports being heavily reduced an impetus has been given to the local supply. The present price allows of business being done on a small scale. To prepare the graphite a certain outlay is necessary, say from Rs. 20,000 to 30,000.

The present railway freights to bring graphite from Ajmer to Howrah is Rs. 70-10-0 per ton, the distance being 1,026 miles. Whereas coal is carried from the Bengal coal fields to Bombay at Rs. 11-4-0 per ton, a distance of say 1,200 miles.

As soon as the war ends and steamer freights are reduced, graphite will again be imported and the local suppliers who have invested their Rs. 20,000 or Rs. 30,000 will have to close their works down. Yet this graphite has been shipped say from Ceylon to England, prepared there and sent out again to India.

If the railway companies would assist in establishing uniform rates towards the sea-board, there is no reason why money should not be safely invested in preparing graphite locally and competing with the home market.

We quote this one specific case to verify our argument.

4. If railways could introduce a uniform rate for minerals, for wagon load traffic, it would help the mineral trade in India considerably. We give a specific case to verify the utility of such a procedure.

If gypsum is carried from Khewra on the North-Western Railway to Porebunder, the following rates are quoted :—

	Rs.	A.	P.
Khewra to Delhi, North-Western Railway, 431 miles	0	4	7
Delhi to Wadhwan, Bombay Baroda and Central India Railway, 519 miles	0	7	3
Wadhwan to Dhosa, Bhavnagar State Railway, 81 miles	0	2	3
Dhosa to Porebunder, Great Indian Peninsula Railway, 143 miles	0	3	9
per maund	1	1	10

Here is an instance of each railway treating this commodity on a different scale, whereas if it is possible to get all railways to quote a uniform rate of say one-tenth of a pie per maund per mile, in wagon loads, it would be an easy matter for a merchant to calculate that it would cost Rs. 17 per ton for the distance of 1,174 miles.

We, therefore, suggest that you should move the Railway Board to induce all railways—

- (1) to classify all minerals for quoting a railway freight,
- (2) that the lowest possible freight should be quoted by all railways for minerals according to class,
- (3) that all railways should quote a uniform rate for freight on all classified minerals.

We consider the subject is of sufficient importance to facilitate the establishing of important local industries and would benefit those interested in a body rather than individually.

No. 1125—1916, dated Calcutta, the 17th June 1916.

From—The Secretary, Bengal Chamber of Commerce,

To—Messrs. ROLFE, MORRIS & Co., Calcutta.

RAILWAY RATES FOR MINERALS.

I am directed to acknowledge the receipt of your letter No. W.—398, dated 26th May 1916, with regard to the rates charged by Indian Railways for the carriage of minerals.

2. You refer specifically to graphite and gypsum; and you suggest also that the Chamber should move “the Railway Board to induce all railways—

- “(a) to classify all minerals for quoting a railway freight;
- “(b) that the lowest possible freight should be quoted by all railways for minerals according to class; and
- “(c) that all railways should quote a uniform rate for freight on all classified minerals.”

3. The Committee of the Chamber have consulted the East Indian Railway authorities, with whom they understand you have also been in correspondence, on the subject of the rates for graphite and gypsum. To deal first with these two minerals it appears that the rate hitherto charged for graphite from Ajmer to Howrah is Rs. 2-9-10 per maund, namely, Bombay, Baroda and Central India Railway 10 annas 1 pie; and East Indian Railway Re. 1-15-9. The East Indian Railway have now expressed their willingness to reduce the rate over their section (*via* Agra to Howrah) to 9 annas 3 pies; and this rate you have, the Committee believe, accepted. It is also the opinion of the General Traffic Manager of the East Indian Railway that the Bombay, Baroda and Central India Railway authorities will probably be disposed to make a corresponding reduction in the charge over their section.

4. You institute a comparison between the rate for graphite and the rate for coal. But as the value of a commodity is one of the various factors which determine railway rates there would naturally be a difference; for graphite is a much more valuable commodity than coal, and bearing in mind the difference in rate does not seem to the Committee to be unreasonable.

5. As regards gypsum the Committee gather that you have applied to the East Indian Railway for a special rate from Khewra, on the North-Western Railway, to Katni and Howrah; and that they have quoted, as their share from *via* Delhi 0-5-3 to Katni, and 0-8-5 to Howrah. This works out to something like one-ninth of a pie per maund per mile; and it suggests that the railway is endeavouring to meet your requirements.

6. The Committee have carefully examined the general suggestions which you make, and which I have set out in paragraph 2 above. They are not, however, altogether clear as to your precise meaning. But they would point out, with reference to your first suggestion, that all minerals are already classified on the various railways. But if your meaning is that uniform schedule rates—*i.e.* rates calculated on a basis below the maximum—should be quoted for all minerals, they question if such a proposition would be accepted. It is the practice on all railways for the freight charges to vary with the value of the commodity, and the general conditions under which it is offered for carriage. The Committee doubt therefore if any useful purpose would be served by advancing this particular proposal.

7. Your other proposal for the quotation of uniform schedule rates on all railways is one which has been already under the consideration of the Railway Conference Association. The Committee understand, however, that the subject is one of difficulty, although the reform is admittedly desirable. It is in point of fact now engaging the attention of the Goods Classification Committee of the Conference at their meeting at Simla.

No. W.-472, dated the 19th June 1916.

From—Messrs. ROLFE, MORRIS & Co., Calcutta,

To—The Secretary, Bengal Chamber of Commerce, Calcutta.

YOUR No. 1125—1916, DATED 17TH INSTANT, RAILWAY RATES FOR MINERALS.

We have to thank you for your above letter and the interest you have taken in dealing with the subject.

2. Both the East Indian Railway and the Bombay, Baroda and Central India Railway have met us in the reduction of freight from Ajmer to Howrah, and we quote the letter we have received from the General Traffic Manager, Bombay, Baroda and Central India Railway.

Memorandum.—"With effect from the 15th June 1916, Graphite stone in wagon loads at owner's risk (subject to the charge on the marked carrying capacity of wagons used) from Ajmer to *via* Agra East Bank (for traffic to Howrah which includes Sealdah, Chitpore and *via* Ultadanga, Cossipore Road and Kidderpore Docks) will be charged Re. 0-3-6 per maund over this railway.

"The through rate from Ajmer to Howrah *via* Agra East Bank will be Re. 0-12-9 per maund thus:—

	Per maund.			
	Rs. A. P.			
Bombay, Baroda and Central India Railway	0	3	6	Special
East Indian Railway	0	9	3	"
	0	12	9	

"loading and unloading to be done by owners."

It is gratifying to note that the rate has been reduced from Rs. 70-10-0 per ton to Rs. 21-8-3 per ton.

3. With reference to your paragraph 4, allowing that graphite is a much more valuable commodity than coal, yet there are other factors to be taken into consideration, for example, the cost of raising coal is about Rs. 1-12-0 per ton for which it can be loaded at the colliery, whereas we are informed by our suppliers that it costs Rs. 75 per ton to put the crude graphite at the railway station. We quote the following from his letter:—

"With regard to the cost of working this mineral, the seams are small and difficult to manipulate, the faults being frequent, and these require to be removed by blasting. A pair of miners with 3 women to remove the debris can only win from 5 to 7 seers of crude graphite per diem, so that a ton at the pit's mouth will cost us roughly Rs. 6-8-0. It has then to be broken up and cleaned, a tedious process, and I estimate, that with bagging, cartage, royalty and other Government and supervision charges, we shall not be able to land the graphite at the nearest railway station at an *actual* expenditure of anything less than Rs. 75 per ton."

The crude graphite has to go through a further process to make it marketable—a ton of crude graphite would probably produce about 8 cwt. of prepared graphite, so that in every 100 tons of crude graphite carried by the railway about 35 tons is put into the market.

Roughly speaking the cost price of prepared graphite is Rs. 293 per ton.

When considering the classification of freight these are points railways should take into consideration. It therefore is in our opinion not unreasonable to make a comparison in the rate for graphite and coal.

4. With reference to paragraph 6 of your letter, what we did mean about classifying minerals on a basis as we have quoted in our paragraph 3, is that the railway companies should not consider they are justified in charging an exorbitant higher rate for graphite because it is sold for Rs. 300 per ton, than they would for coal that is sold at Rs. 4 per ton.

This argument applies to other minerals besides graphite, we quote graphite as a specific case.

We shall be glad if your Committee will reconsider this point and take it up as they may think fit.

5. With reference to your paragraph 7, from a merchant's point of view the quotation of uniform schedule rates on all railways is one that would help trade considerably, and we cannot too strongly urge a reform on these lines. There may be difficulties due to some railways having to be worked more expensively than others, but we submit that such a system would allow merchandise to be booked by the shorter routes for export, a decided advantage to trade.

In going into the reduction of freights we have had considerable correspondence with the East Indian Railway and the Great Indian Peninsula Railway, and have been given every assistance by both these railways, but with other railways we have found great reluctance on their part to consider reductions.

No. 1251—1916, dated Calcutta, the 6th July 1916.

From—The Secretary, Bengal Chamber of Commerce,

To—MESSRS. ROLFE, MORRIS & Co., Calcutta.

RAILWAY RATES FOR MINERALS.

I am directed to acknowledge the receipt of your letter No. W.-472, dated 19th June, in this connection, and to say that the points which you raise are receiving the attention of the Committee of the Chamber.

No. W.-651, dated Calcutta, the 31st July 1916.

From—Messrs. Rolfe, Morris & Co., Calcutta,
To—The Secretary, Chamber of Commerce, Calcutta.

RAILWAY RATES ON MINERALS.

In continuation of correspondence we have had with you on the subject of uniform rates over all railways for minerals, we gave you specific cases of graphite and gypsum. We have had some correspondence with various railways regarding a uniform reduced rate for China-clay.

We send you a copy of a letter addressed to the General Traffic Manager, East Indian Railway, and we also addressed the—

Madras and Southern Mahratta Railway,
Bengal Nagpur Railway, and
Great Indian Peninsula Railway, on the same subject.

2. In April 1916 the rates for China-clay from Bhagalpore were to—

		Rs.	A.	P.
Howrah	 per maund	0	7	10
Cawnpore	 „	0	13	5
Lucknow	 „	0	14	0
Bombay	 „	2	0	8
Bawar	 „	1	9	5

The Bombay rate works out to 55-2-2 per ton.

It cost about Rs. 50 per ton to prepare China-clay without machinery and put it on rail at Bhagalpore.

The market rate for China-clay to-day in Bombay is Rs. 85 per ton for local produce and Rs. 95 for the imported.

The price of China-clay before the war was about £4 per ton.

3. Kaolin from which China-clay is prepared is plentiful in Bengal.

The cost of plant, etc., to prepare China-clay is about Rs. 25,000.

To put down this money and have to close down after the war, owing to the imported China-clay being delivered at much lower rates than what the local production can be sold at, requires forethought. Two factors have to be taken into consideration.

(1) Reduction in the price in manufacture.

(2) Reduction in transport charges.

The first can be effected and should be reduced by about 50 per cent. by the introduction of machinery, etc. Even then the high railway freight debars the local production competing with the imported.

4. We enclose a letter we have received from the East Indian Railway which in itself is most satisfactory and which shows their willingness to encourage such industries.

Much depends on the action of other railways and if you can take this matter up, further, we think it would benefit the China-clay industry considerably.

No. 1584—1916, dated Calcutta, the 12th August 1916.

From—The Secretary, Bengal Chamber of Commerce, Calcutta,
To—Messrs. Rolfe, Morris & Co., Calcutta.

RAILWAY RATES ON MINERALS.

I am directed to acknowledge the receipt of your letter No. W.—651, dated 31st July 1916, with reference to railway rates on China-clay.

2. In reply I am to say that the Committee of the Chamber have considered the points which you raise, and they observe that the reductions made by the East Indian Railway in the rates for China-clay are satisfactory. They think that the other railways will also be willing to meet you in the matter as the East Indian Railway has done. But it occurs to them that the question of manufacturing China-clay might be brought to the notice of the Indian Industrial Commission, and they suggest that you make a representation to the Secretary of the Commission, defining any proposals which you may wish to put forward for establishing the industry. The address of the Secretary is R. D. Bell, Esqr., I.C.S., Secretary, Indian Industrial Commission, Camp.

No. W.-781, dated 6th September 1916.

From—Messrs. ROLFE, MORRIS & Co., Calcutta,

To—R. D. BELL, Esq., I.C.S., Secretary, Indian Industrial Commission, Camp.

MINERAL INDUSTRY IN INDIA.

At the suggestion of Committee of the Bengal Chamber of Commerce, we have much pleasure in forwarding copies of correspondence we have had with the Chamber.

From the correspondence you will glean that our contention that the rates charged for freight for minerals is not conducive to encourage mineral industry in India. We have given specific cases in which we have pointed out that excessive railway freights debars money being invested in furthering the industry.

We consider if all railways would introduce a reasonable uniform rate for minerals as is done for coal it would help to develop the Indian mineral industry.

Demi-official No. 498, dated the 22nd September 1916.

From—R. D. BELL, Esq., I.C.S., Secretary, Indian Industrial Commission,

To—Messrs. ROLFE, MORRIS & Co., 3-1, Mangoe Lane, Calcutta.

I am directed to acknowledge receipt of your letter, reference No. W.—781, dated the 6th September 1916, and to say that the question of railway freights is one that will receive consideration by the Indian Industrial Commission.

NOTE.—Mr. Rolfe did not give oral evidence.

WITNESS No. 193.

Mr. H. W. Newby.

Mr. H. W. Newby, Tea Cess Commissioner for India, Calcutta.

WRITTEN EVIDENCE.

Q. 38.—I suggest that the Government departments should buy tea in accordance with the suggestion embodied in the letter* from the Indian Tea Cess Committee, No. 43-T.C., of the 20th June 1916, to the Quartermaster-General in India. In view, however, of the alterations already made by the Director of Supply and Transport, which partly meet the case the Committee may think it inadvisable to again raise the question.

Qs. 91 & 92.—I suggest that—

Whosoever shall keep a room or rooms where tea is blended and packed shall declare the same to the Health Officer or incur a heavy penalty, and

Whosoever shall colour tea after it has once left the original factory shall incur a heavy penalty, and

Whosoever shall blend with tea any substance other than tea (such foreign substances to include parts of the tea plant which do not pass the standard for the necessary composition of tea) shall incur a heavy penalty. (The necessary composition of tea should be that given in Allen's Commercial Organic Analysis, Volume VI), and

Whosoever shall sell any tea waste without fully satisfying himself that the purchaser himself, or his firm, will use the tea waste for chemical purposes only, shall incur a heavy penalty.

NOTE.—Mr. Newby did not give oral evidence.

WITNESS No. 194.

Hon. Mr. B.
Chakravarti.

HON'BLE MR. B. CHAKRAVARTI, Bar.-at-Law, Calcutta.

WRITTEN EVIDENCE.

The reports on the industrial survey of Bengal by Messrs. Collin, Cumming and Samman contain the history of the present condition of the very few industries which now exist in Bengal. I can hardly add anything new to the points discussed by them. I am however making a few suggestions and observations of a more or less general nature, specially with reference to Bengal.

Raw materials.

Of these, coal and iron have been the foundation of all industrial progress in the West. We had both of these in abundance in old Bengal. Valuable stores of mineral wealth in Behar, Chota Nagpur and Orissa, have been assigned ever since the last redistribution of territories, to the sister province. It has become more difficult for Bengal capitalists to get

* Not printed.

prospecting leases from the Behar Government, unless the managing agency is given to a European firm. Perhaps, the Commission might see its way to recommend that the two Governments should have a Joint Board to control mineral and mining industries with its head office at Calcutta. Such a Board can deal with all matters relating to the development of mineral resources of the country.

If we take away coal and iron, Bengal, as at present bounded would be only an agricultural province. Industrial progress here must mainly depend on raw materials supplied by agricultural and allied occupations. In order to increase the quality and quantity of such raw materials we must resort to improved agricultural methods. The Agriculture Department of the Government has done a great deal and recently there has been renewed activity. But the department loses in its usefulness as it is not equipped with a single laboratory dealing with agricultural chemistry, nor is it in a position to make experiments in scientific agricultural methods on modern lines. Perhaps Cirencester used to be nearer the Bengal cultivator than Pusa and Sabour are at present. The agricultural methods should therefore be brought nearer home. The department should be strengthened by the addition of qualified commercial experts and agricultural and technological chemists, to advise it as to the quality and nature of the raw materials required for industrial operations. The Department of Agriculture and the Department of Industry must, in Bengal at any rate, work hand in hand.

With a little organisation of labour and capital, the volume of industry that can be built up in Bengal with the raw materials now available is simply enormous. I venture to think that industrial progress will solve not only the question of economical distress but of political unrest to a considerable extent. I will illustrate what I mean by a few examples.

(1) *Tobacco*.—The finest variety of leaf can be grown in North Bengal, specially in the Rangpur and Cooch Behar Districts. Here it is to be noted that a few experts in curing are locally available. With some capital and the introduction of modern scientific methods for growing, rearing and manufacturing tobacco there is no reason why Bengal should not be able to be one of the largest exporters of cigars and cigarettes. Special industries.

(2) *Silk*.—The story about His Excellency Lord Carmichael's silk handkerchief made in Berhampore is well known and would show that this home-industry can hold its own if well organized. But the art of sericulture must be kept on a high level. I may be permitted here to mention that the silk manufacture on a factory scale which was carried on only in one place, at Mr. Ariff's factory at Ultadinghi near Calcutta, is capable of expansion. But this single factory has recently had to practically close down owing to the difficulty about aniline dyes. In this matter we are at present helpless. The result is that the Calcutta market is being flooded with cheap Japanese flimsy silk. This problem requires immediate solution.

(3) *Paper manufacture*.—Apart from cotton rags and other cotton waste, straw and various kinds of suitable grass and other raw materials for paper making are available and can be largely grown. The Bally and Titaghur paper does not seem to have the necessary strength to bear the strain of the rotary press. But this defect can surely be got over by scientific experiments in suitable mixing.

(4) *Pen, pencil and match manufacture*.—There seem to be several competent young men trained in Japan who know the technical side of these industries. But the chief difficulties in these industries seem to be (1) want of commercial training and (2) want of suitable wood in proper quantities.

The wood problem has been noticed by the writers of the Reports mentioned above. But there does not seem to be any reason why the suitable wood cannot be produced in abundance by the rich plains of Lower Bengal or the hilly tracts of the Eastern and Western Bengal. Forests of suitable plants could be grown. Local Boards could easily add to their income if they went in for forestation of a portion of their lands. This could be done under the supervision of competent forest officials who have some knowledge of these industries. This source of supply of the necessary wood may take time to develop, perhaps a generation. In the meantime, the Forest Department might yet be coaxed into activity as suggested by Mr. Samman, and the railways might be induced to give favourable rates to carry these woods from the Himalayas.

(5) *Timber trade*.—I may by the way add here that the timber trade can also be a very profitable industry. There is no reason why with a little organisation Bengal should not produce its own timber and undertake its own wood manufacture, instead of importing wood from Burma and Australia and its skilled carpenters from China.

(6) *Spirit distilling* specially of denaturalised spirit, for industrial and domestic purposes. This is another industry which depends largely on agricultural improvements. We grow plenty of potatoes, corn and fruits for this industry.

(7) *Jute industry*.—Bengal has the world's monopoly of jute. There is no reason why she should export practically the whole of her produce in raw materials and not manufacture the same into hessian, and gunny and canvas. Just as Lancashire controls the textile market of the world, Bengal could, if properly organised, do the same regarding jute. This would require plenty of capital which could be induced to flow into the industry, as explained later on. This would also require considerable scientific experiments in growing longer fibres, and in more convenient methods of bleaching, retting, and extracting the fibre. If we began manufacture on any large scale, Dundee might feel hurt, and Hamburg might be angry. I may discount Hamburg but there seems to be room for all in this large industry.

Rope and net making.—A small sister industry, that of rope and net making, might also be profitably undertaken under proper conditions.

(8) *Cotton industry.*—Some say that this industry is not suited to Bengal. But she was famous for her muslins and she still weaves practically all the finer *dhotis* and *saries* used by the higher and middle class people. But the whole of this industry is a home-industry. The weaver's chief difficulty now is to get the finer counts of yarn. Though he has not as yet taken kindly to the fly shuttle, this only shows the necessity of organising the industry and making full use of demonstration stations. As regards the difficulty about the finer counts of yarns, this can probably be met by encouraging yarn manufacture as a home-industry. Millions of agriculturists in Bengal work only for about three months in the year in the fields. If organised, they can easily turn their hands to home spinning.

The experiences of the Banga Luxmi Cotton Mills notwithstanding adverse circumstances also show that with proper management there is a great future for the cotton industry even on a factory scale.

But here again, scientific agriculture must come in. The British Cotton Growing Association, with its large Government subsidy, has not as yet made any serious attempt to grow cotton in Bengal. The rich red clay of East Bengal can yet produce the long staple cotton with which she manufactured and to some extent still manufactures the yarn for the Dacca muslin.

(9) *Wool.*—As long as Tibet sends her wool to the Kalimpong market for sale, Bengal ought to be well provided with all the raw materials she requires. For the finer and softer variety, we may have to depend on outside markets. But the chief difficulty in the woollen industry has been a technical one, *viz.*, proper bleaching. These could be easily got over by scientific experiments on a commercial scale at the central chemical laboratories. We import millions of half-woollen German "wrappers" and socks. There is no reason why we should not supply the whole of this want ourselves, instead of being satisfied with producing a few coarse blankets only.

(10) *Sugar industry.*—A good deal of attention has lately been given to this industry, especially in the Upper Provinces. It seems to be difficult to compete with Java. But if Java has to be met, it must be met with Java methods. They produce their sugar on a most extensive scale under the supervision of highly trained scientific agricultural experts who are continually making experiments in order to improve the yield of the cane.

The date palm should also be given a thorough chance. There are millions of trees in Bengal alone, and thousands of expert tappers are available. Necessary agricultural experiments should be made to find out how to grow date palm to yield the maximum quantity of juice and palms suitable for sugar manufacture and the best methods of manufacturing date sugar.

(11) *Leather.*—We are one of the largest exporters of raw hide, a very large portion of which we import back after it has been at all events dressed and tanned if not manufactured. This is one of the industries with a brilliant future. Here again technological chemistry would be able to give the greatest assistance to this industry. There are now several young men who have been trained in this industry in Japan, England and America. But they lack commercial experience without which technical skill avails nothing. We ought to be able to retain all the raw materials now exported and manufacture leather goods for our own use and for export.

In connection with this, attention should also be given to cattle breeding on a scientific basis. The bullock cart will for generations yet remain the chief means of goods transport over country roads. The cart and the plough will require the best breed of bulls. The cows can yield sufficient milk which may be made the foundation of yet another industry, namely, butter and cheese making.

Not only is it necessary to improve the breed of cattle, but something must be done to stop the immense waste of cattle food and manure which is going on now on account of the wholesale export of oil seeds.

(12) *Oils and tallow trade, soaps and candles.*—We produce enough quantity of oil seeds which we are content merely to export. We can vastly improve the quality and yield with a little scientific attention. There is no reason why seed crushing should not be undertaken on a large scale. This will leave in the country large quantities of very valuable manure and cattle food. The soap, candle, and tallow industries have all the raw materials here. It only requires sound management to make these trades flourish.

(13) *Small industries.*—Home industries will always form a large part of the industrial activities of Bengal. It will therefore be necessary to organise these. How to supply the raw material to the home workers, to collect the finished articles, to teach the workers the best and most profitable of work—these would be the problems of the future. I have made some suggestions later on under the heading of organisation.

Small industries like hand-loom weaving, yarn spinning, knitting, fish curing (for tinning purposes), basket making, toy making, etc., can be profitably undertaken as a secondary occupation by millions of cultivators who sit idle for about 9 months in the year. Small capitalists from the middle classes, male and female, would be glad to go back to their villages if they could earn a livelihood by taking up such small industries as hosiery, brush

and button manufacture, bone and fancy articles, shell and *sankha* goods, toy making, lac-work, embroidery and lace work, small garment making (e.g., silk and muslin handkerchiefs), tinsmith work, small iron and metal industries (e.g., locks, nails, screws, hinges, cutlery), wood carving, and manufacture of baskets, such and other articles of furniture.

In this matter, the Government could afford great assistance to the small workers by supplying machinery and plant on the hire purchase system. The small capital required for these industries would be forthcoming either from the co-operative credit societies, or from the workers themselves. We know that if a cashier's post with cash security is advertised hundreds of applications flow in and the candidates are willing to pay down cash. There is no reason why small capitalists should not be forthcoming if these industries are properly organised.

(14) *Electric and water power.*—Besides having plenty of coal we can perhaps develop the power industry and utilise the enormous water-power available in Bengal. The Mourbhanj and the Darjeeling hydro-electric schemes, if properly organised, could supply enormous quantity of power necessary for various industries. The Bengal delta with its hundreds of outlets into the sea, through which a strong tide travels up and down for about 70 miles from the sea, twice every day, should, if properly harnessed produce an unlimited quantity of power. But these schemes would require big minds to work them out and such minds would probably be able to get together the large capital required.

Under present circumstances, it is absolutely necessary that the State should organise capital and labour. Indigenous capital is shy and will not flow in. It is a case of once bit, twice shy. Several recent failures in swadeshi enterprises have created an impression that the Bengali is unable to carry on and manage any profitable industry. Dishonest swindlers have often exploited the swadeshi enthusiasm, and commercial dreamers have tried to carry on industries relying on men with some technical but no commercial training. They have built hopes of a dividend to be paid for by consumers who were expected to buy "even at a sacrifice." This enthusiasm is good for the purpose of the building up of a new market, but cannot be the permanent basis of a business. Not being carried on on business lines, many have failed, and in their fall have frightened away Indian capital. As to labour also, the educated middle classes do not take kindly to any industry or business. But there is no doubt that a change has, of recent years, taken place. The educated young man no longer hankers to the same extent after a clerkship as he used to do. Dignity of labour is being more and more recognised. This is the right moment for the State to step in and with the help of eminent captains of industry and commercial magnates, to organise this educated class for the progress of industry in Bengal. Instead of curbing the enthusiasm for higher education, the State should make the fullest use of those who come out of the University intellectually fully equipped. Instead of refusing a grant for the laboratories and workshops of an institution like the University College of Science in Calcutta, the State should also provide, to the utmost of its power, for central commercial laboratories, commercial museums, laboratories for agricultural and technological chemistry, where the best minds can do good work. Instead of allowing thousands of graduates to shift for themselves and get discontented with their life when they cannot find work, the State should try and utilise them and find an outlet for their energies by organising as it were a vast commercial service.

There are, for instance, over 2,500 (two thousand five hundred) graduates who are to-day reading law in Calcutta alone. Some of them are Masters of Arts and not a few are Masters of Science. Bengal does not need such an enormous supply of lawyers. And yet it is difficult to see what these young men are to do. The remedy does not lie in insisting on a "low percentage of passes", nor in curbing by artificial means the enthusiasm for higher education. It seems obvious that if some scheme could be organised by which the energy of these young men could be diverted into a proper and prosperous industrial channel, much of the present day problems in Bengal will be solved thereby. There is no reason why a graduate should go in for a three year's course of law studies with its uncertain future, if he was reasonably certain of a more or less prosperous career in the commercial line.

If, then, these young men could be utilised and trained by commercial and industrial experts, brought out, if necessary from Europe, a class of trained supervisors of superior grade and skilled managers of industries would in time be produced. For instance, some of the more brilliant of them could take to research work in technological and agricultural chemistry. Others could be utilised in making known and popularising the valuable commercial intelligence collected by the Government departments. The home industries could be organised through them. They could be used for supervising such work as travelling agents, or as distributors of raw materials and collectors of finished work, and they could be usefully employed as sale agents on a large scale. Graduates in economics, for instance, could be used as lecturers, and writers of popular articles relating to industries, some could be used for demonstration work and lantern lectures. And there would be a large number, who would go in for actual manual industrial training, if only there was a decent prospect before them. They would of course refuse to work for all time as an apprentice and day labourer, with no prospects of being a foreman mechanic, or a manager of works.

These schemes would require that the Government should for sometime at any rate be a large industrial owner. This can be done either by the Government being substantial shareholders in demonstration factories, or by guaranteeing a dividend, in exchange for fully paid up shares. The Government would thereby be entitled to nominate its experts and perhaps its

monograph writers, as directors of such companies. The managing director should, for the present, be a European expert in the industry but must be wholly unconnected with any of the local competing firms. The result to be aimed at should be two-fold. *Firstly* to divert the educated young men into the commercial and industrial line and in time enable them to undertake and carry on businesses unaided by the State. *Secondly*, to create a new confidence in our business capacity then the capital would naturally flow in. The guardians of these young apprentices would probably take considerable amount of shares in such companies, once confidence is established. When such a company proves successful and pays regularly a good dividend, the Government would then be justified in selling off at the market value the shares belonging to it. If properly organised, I do not see why the State should not even make a profit out of a scheme like this, specially when we know that the Government itself is a large consumer.

Uneducated labour.

The question of the building up of an artisan population would be largely solved if educated labour can be organised and utilised on some such lines as indicated above. When the educated class takes to industry, an artisan class is bound to arise. It would then be much easier to solve the problem of the industrial education of the masses, because the teachers would come from the educated industrial classes. In large manufacturing centres, near towns for instance, where the factory system would naturally prevail, other problems besides industrial problems would arise. For instance, the proper housing of the artisans would have to be looked after. Otherwise the home-loving villager would not be induced to come and live near a factory even for higher wages. Recreations and amusements would have to be provided on an organised scale. Many of our skilled artisans have no broader outlook on life than working hard for six days and then not turning up for work next week till the wages which he had earned have disappeared in toddy shops and public houses. In time, there must be provisions made for workingmen's evening classes, for elementary instruction (by demonstration and otherwise) upon economic, historical and other subjects. Libraries and reading rooms suitable for them, experimental farms, and demonstration stations, etc., would all have to be provided—all with the one purpose of making labour more efficient, more self-reliant and more dignified.

Capital.

Lastly, capital now lying idle must be drawn out. This can only be done, as indicated above, if confidence is once created in industrial ventures. This again can easily be done if the State takes a substantial interest in establishing industries, as I have stated above. If there is some guarantee, and if possible a State guarantee, for efficient supervision, and if at the same time people feel that a body of young men would be carefully trained up by commercial expert-managers and in time would be able to hold their own, I have no doubt that capital would flow in and industrial progress in Bengal would be assured.

NOTE.—Witness did not give oral evidence.

WITNESS No. 195.

Mr. J. K. Sircar.

MR. J. K. SIRCAR, *Sukchar, 24-Parganas.*

WRITTEN EVIDENCE.

It is a recognized fact that India possesses a vast resource in her vegetable fibres. There are among others, three distinct fibre-yielding plants of considerable commercial value. I have been engaged for a number of years in making experiments in this direction, the results of which I now beg to lay before you in the hope that it will contribute to the development of this industry.

1.—*Agaves.*

The Aloe plants especially *Agave Americana*, *Vivipara* and *Fourcroya Gigantea*, grow wildy throughout India. Experiments made with these plants go to show that *Agave Vivipara* and *Fourcroya* are the best varieties that could be chosen for planting. The fibre of the former is as good as sisal hemp. The price of these fibres vary from £20 to £30 per ton. An expenditure of £12 more or less is incurred in making a ton of fibre ready for export. The fibres can be sold here as well for making twines, ropes and matting. Lately they are being used to a certain extent in making brushes.

2.—*Sansevieria.*

Sansevieria Zeylanica grows wild in some parts of Bengal and Southern India. It yields a very valuable fibre commercially known as bow-string hemp. As far as my information goes no attempt on a commercial basis has yet been made to utilise this fibre. The fibre, though short in length, is silky white and very strong. A local market can easily be created for the purpose of making canvas, etc. This will command a fair price in London as well.

3.—*Plantains.*

It is cultivated in almost all the provinces chiefly for its fruit, but no systematic attempt has yet been made to utilise its fibre, which is of great commercial value. There is no efficient machine, to extract it on a commercial scale.

The samples sent by me to several firms of fibre importers in London, were reported upon favourably. The price quoted was £24 to £27 per ton. They wanted to close with me for 9 to 10 tons per shipment.

Messrs. Moll Schutte & Co., of Clive Buildings, Calcutta, pronounced my samples to possess certain merits and they asked me to supply them with 300 maunds of fibre of different qualities for the present. This fibre can also be used locally for a variety of purposes.

People of small means cannot take to this profitable business for want of cheap machines. I have after many experiments succeeded in making simple and at the same time cheap machines for the purpose of extracting leaf as well as stem-fibres.

To embark on this business the planter has to serve no apprenticeship, for technicalities appear conspicuous by their absence. Beyond confidence and a small capital required to make a beginning one need have no other qualifications. All that is required is support from the Government in the shape of long lease of lands on favourable terms and financial aid when and were necessary through co-operative banks. Our Rajahs and zamindars can give an impetus to this fibre industry by granting lands free for a certain number of years and a small capital to deserving men.

NOTE.—*Witness did not give oral evidence.*

WITNESS NO. 196.

THE "INDIAN ENGINEERING ASSOCIATION, Calcutta.

WRITTEN EVIDENCE.

*Indian
Engineering
Association.*

Introductory.

The object of the Indian Engineering Association in compiling the following note is to draw attention to the difficulties with which the engineering industry in India has had, and still has, to contend with in its efforts to secure a fair share of Government orders. The great majority of these orders are placed out of India, to the detriment not only of an important manufacturing industry but, the Association contends, of the country generally. The withdrawal of funds from the country that could be profitably employed in it must, the Association consider, result in an ultimate loss to the country's prosperity, and it is desirable that this point should be kept in view.

In the following pages a brief resumé of the question is given, together with the Association's suggestions for remedying the present unsatisfactory position.

The official correspondence* on the subject, and extracts* from the Association's proceedings, in connection with it, are appended to the note, for reference.

Note on the position of the engineering industry in India.

The engineering trade in India has been developed from small beginnings until, at the present time, the capital invested in it amounts to about four millions sterling, approximately. The trade has achieved this position in the face of the strong prejudice against locally made articles, and discouragement of many kinds; consequently the concerns which have survived feel themselves fully capable of holding their own on equal terms with any competitors, British or Foreign.

In the year 1905 the Association memorialised the Government of India regarding the stringent restrictions then existing against the local purchase of material or plant. This led to a consideration of the question by Government and to the appointment, in February 1906, of a Committee to enquire into the procedure prescribed for the purchase of stores for the use of Government departments in India. The Committee visited the important manufacturing centres, obtained the views of the representatives of the various firms, and presented their report to the Government in July 1906. The Government of India in due course submitted proposals to the Secretary of State and, in July 1909, published a resolution reviewing the whole subject, and describing the alterations which it had been decided to make in the rules. The revised rules, from the point of view of the Association, still left much to be desired. The Government of India intimated, however, that the rules had been the subject of the lengthy correspondence with the Secretary of State for India, and they were unable to refer them to any public body for consideration previous to issue.

The next step taken by Government was to establish an inspecting staff for the purpose of testing and passing supplies purchased in India. The Association had advocated this and suggested that the staff of the Superintendent should be highly qualified in their particular branches, such as bridge work and railway waggons. This matter is further dealt with towards the end of this note.

The working of the stores rules continued to form the subject of correspondence with the Government of India, and of interviews with the Member in Charge of the Department

* Not printed.

of Commerce and Industry. This resulted in amended rules being published with a resolution of the Government of India, dated 12th September 1912. In one respect the Association has failed to bring about an alteration which appears to them to be most essential. This is in connection with rule No. 8, which reads as follows:—

RULE 8.—*Forecast of requirements.*

"All requirements should be fulfilled locally in accordance with the provisions of the Resolution No. 4941-4988-102, dated the 14th July 1909, provided that quality and price are not unfavourable and provided that such purchase does not violate any of the instructions contained in these rules. In cases, however, in which stores have to be obtained through the India Office, every effort should be made to foresee requirements so that the indents may be despatched in ample time. Persistent failure of any officer to make such efforts should be brought to notice by the Local Government or other authority, which may at its discretion, cancel or reduce the powers of sanction entrusted to the officer at fault."

The objection to this rule, from the Association point of view, is that the last sentence might be regarded as an *incentive* to prepare home indents. While there was this incentive to the preparing of home indents, there was no corresponding incentive as regards local indents.

A further step taken by the Government of India was to publish, for the information of the Association, a half-yearly list of indents sent to the Secretary of State, the idea being that members of the Association would thereby be placed in a position to submit quotations to the departments concerned, for similar articles of their own manufacture, or imported articles which they might be able to supply. The drawback here, of course, is that the indents have already gone forward, and quotations from local firms are by that time of little more than academical interest to the officer or department concerned. The Association submits that the remedy for this is that all indents, before despatch to the India Office, should be submitted to the local Government concerned, or to the Department of Commerce and Industry of the Government of India to be dealt with by a special officer whose duty it would be to recommend which of the indents could be satisfactorily placed in the country.

The Indian engineering industry is at present passing through a very critical stage. Modern equipment, skilled labour and experienced supervision are ready at hand, but there is not sufficient work to keep the shops going, and large numbers of workmen have had to be disbanded. The Association submits that the time has arrived for a careful consideration of the position. Side by side with the scarcity of working the country there is the object lesson of the half-yearly lists of indents sent to the India Office. The list for the half-year January-June 1914, total 290 printed pages of foolscap size and the list for the half-year July-December 1914, consisted of 218 pages. Both lists show that a considerable amount of work could have been given out in the country had there been a department charged with the special duty of scrutinising the indents before they were sent home. Attention is here invited to the Association's letter* to the Government of India, No. 11-I. E., dated 3rd February 1915, bringing to their notice the unsatisfactory state of the engineering trade. In it the Association states:—

"During the past few months there has been a very considerable falling off in orders. As existing contracts have been completed there has been little or no new work to take their place, and the necessary consequence has been a reduction in establishments. This being the case as regards the works with which the individual members of the Committee are connected, the question arose as to whether works in other parts of India were similarly affected. The Committee accordingly issued a circular to all members of the Association, asking how far their works were affected, or were likely to be affected, as regards reductions of establishment owing to decrease of orders. The replies received in response to this enquiry show that the slackness of trade is wide-spread. A summary of the replies is appended hereto for the information of Government. In the case of one establishment alone, it will be seen that the reductions which have been made, and those in prospect, mean a loss in wages of over Rs. 76,000 per month. The Committee feel that comment on these figures is superfluous; their significance as an indication of the distress entailed on the workers through the loss of this large sum monthly, in wages, is plain and unmistakable.

In these circumstances the Committee consider it to be their duty to approach Government, with a view to enlist their sympathy and assistance in the critical position in which the industry is at present, placed. The Committee respectfully urge that expenditure under the forthcoming budget, on such requirements in connection with railways and public works as can be produced in this country should be curtailed as little as possible, in order to keep the works going and to provide against unemployment, as far as possible. And the Committee would further ask that stringent orders be issued by Government in order to ensure that all such work shall be confined to India. The Committee feel that without this the sanctioning of expenditure will be of little avail in helping to tide over the present trouble. They cannot too strongly urge upon Government the need for insisting upon this point, as upon it depends the question as to whether such expenditure as is sanctioned is to provide employment for the workers in this country, or is to go to home manufacturers, as has been so largely the case for years past. Rule No. 8 of the revised rules, for the purchase of stores for the public services, has so far not fulfilled the expectations to which it gave rise. It is the view of the members of the Association generally, that it has had no appreciable effect on local indents. In the opinion of the Committee, the most scathing indictment against the working of the stores rules in general, as of rule 8 in particular, is furnished by the latest published list of Home Indents, viz., that for the six months, January-June 1914, a volume which extends to 290 pages and in which instances of orders sent home which could have been executed in India are very numerous. The stores rules as they now stand leave little to be desired; it is the apparent want of recognition, by the departments and officials concerned, of the spirit of the rules and of the purpose of the Government of India in framing them, viz., the encouragement of local industry, of which the Association has so greatly to complain. If the rules were interpreted in practice, in the spirit in which they have been framed, the present position of the industry would have been, the Committee venture to think, very different."

* Not printed.

The Association feel that it is unnecessary to deal further with the defects of the system in this note, and they will now state what they consider to be necessary in order to bring about an improvement, and secure to the industry a fair share of Government work. The Association's recommendations are as follows :—

- (a) That there should be attached to each Local Government or to the Department of Commerce and Industry of the Government of India, a special officer whose duty it should be to examine indents and to recommend which orders should be placed in India. It would be necessary, of course, that such officer should visit the various works in order to satisfy himself as to their capabilities.
- (b) That certificate granted by the Superintendent of Local Manufactures should be accepted in the case of delay due to causes beyond the contractor's control on the same being explained to the satisfaction of the Superintendent.
- (c) That the concluding sentence of Rule No. 8, of the stores rules, to which attention has been drawn in this note should be deleted. The Association believes that the wording of this part of the rule is responsible for a large amount of work being sent out of the country.
- (d) That indenting officers should be encouraged to visit local engineering works. Such visits would be useful from more than one point of view—they would not only be instructive to the officers, as regards the capabilities of the works, but they would also bring about personal acquaintance on both sides which could not fail to be useful in connection with references regarding the execution or progress of work.

NOTE.—The Indian Engineering Association did not give oral evidence.

WITNESS No. 197.

SIR DANIEL M. HAMILTON.

*Sir D. M.
Hamilton.*

WRITTEN EVIDENCE.

The Commission were good enough to ask me for any remarks I might like to make in connection with the industrial development of India. In the first place I should like to say I am unable to find the time to sit down and answer in detail the numerous questions set out in the printed papers you sent me. My remarks must, therefore, be only of a general nature.

The first essential in the starting of any industry is money. Therefore, in my opinion, the first thing the Industrial Commission have to do is to find the money, or rather to show where the money is to be found, to set industry agoing. If the people of India have no money, and are deep in debt, it is difficult to see where the money for industrial development is to come from. When the people are out of debt, and have the command of money, industry will hum, for they will then have the money to put into industry, and to buy its products.

It may, of course, be possible to collect enough capital for particular industries, or even to double industries already existing, but to develop industrial life generally, among three hundred millions of people, is a big job requiring practically unlimited capital. You might, for example, find money enough to increase the cotton industry sufficiently to capture the whole of the Manchester cotton trade, but its capture would mean the employment of only another half million or so of people, and what are these among so many? You might set ten Tatas iron works agoing, but these would provide employment for only another 120,000.

In my opinion the only sound way to develop Indian industries, on a scale proportionate to the population, is to develop the credit of the people and the Government. Credit is purchasing power, and if you increase the purchasing power of 300 millions of people by even £1 per annum you will have a demand springing up for all kinds of manufactures, both Indian and European. Why, for example, is there no woollen industry to speak of in India? Is it because the people prefer to shiver in cotton these cold days and nights, or is it because they have not the money to buy wool? On my property in the Sunderbans I see the neighbouring Mahajan walking around wearing a nice woollen shawl and patent leather shoes. He belongs to the cultivating class, the difference between him and them being that he has the money to buy warm clothing and they have not. Increase their purchasing power by improving their credit, and they too will buy warm shawls and patent leather shoes, and you will have woollen mills and leather and shoes factories springing up all over the country. In my address to the students of the Scotch Churches College the other day, of which I enclose a copy,* I instanced, from my own observation, how the sugar and handloom industries of the Deccan were being starved for want of money. People who have no money can buy nothing nor start anything new. When the money problem is solved the rest will follow.

How then is the money problem to be solved? It is idle as well as unnecessary to look to London for money, for if India could not get enough money from London in the palmy days when it was plentiful and cheap, she is not likely to get it when the war is over. India must develop her own money power. Credit, which is becoming more and more the money power of the world, is neither gold nor silver but a spiritual quality represented in its material

* Not printed.

aspect by paper money in its various forms. It follows, therefore, that the salvation of India lies in the development of her credit and her paper currency along sound lines. Unfortunately, India is so far behind the rest of the civilised world in monetary development, that she cannot yet dispense with a considerable metallic backing for her paper money, but this need cause no anxiety, for there is a steady stream of gold flowing into India in payment of the balance of trade, and all that Government need do is to catch and divert the current into the Government Treasuries, there to support the paper issues. Council bills form the trap or bait for catching the gold fish, and the bait (or rate) should not be made too "high" if the Government want to catch the fish.

The additional paper issues would be made for value received or for value to be created; and it is here that the co-operative credit movement can be made a powerful auxiliary in the development of the paper currency. Government might, for example, entrust the co-operative societies with the management of its takavi loans, issuing the loans to the societies in the form of paper money. The money would be spent in solid assets, such as well construction, and would be repaid by instalments as arranged. India is thirsting for water, and if water can be brought to a thirsty land by a papermache channel it is folly to construct channels of silver or of gold, especially when these cannot be got. The value is not in the channel whether it be gold or silver or paper, but in the well which the money constructs and the crops which result from the well. And if the well can be made from paper it is folly to waste silver and gold.

In the same way Government can go on with the construction of its own irrigation projects by paying for these with paper currency. Every rupee so issued would be represented by so much canal constructed. Issue and construction would balance each other, so that there could be no inflation of the currency.

As the co-operative movement grows, the capital available for industrial development will grow. The people's surplus, which now falls to the Mahajan, will fall to the people and become deposits in the co-operative banks. Working for themselves instead of for others, the people will work with greater heart, and their crops and deposits will grow in proportion. When each family in India has at its credit the modest sum of £10, there will be £500,000,000 available for industrial development; but the money cannot accumulate while the Mahajan is India's banker. The capital available for industry will grow only as the co-operative credit movement grows. Therefore, it is the duty of Government to provide more men for the development and organisation of the people's credit by the only method which has proved equal to the task, viz., the co-operative method. As the co-operative movement and the paper currency develop, the coinage of silver will automatically cease. This may not suit the London silver brokers or the Bombay silver gamblers, but it will save India six or seven millions of gold every year to still further back her paper currency and help on the industrial development of the country.

That the people have more confidence in the co-operative banks than in any other is clearly shown in Sir Edward MacLagan's co-operative report, paragraph 210. And as the confidence of the people is, according to the MacLagan report, based on the Government's connection with the movement, there is here a clear call from the people for Government to associate itself definitely with the banking requirements of the country. I would further refer you to paragraphs 212 to 220 of the MacLagan Commissions' report where it is clearly hinted that an Apex State Bank may be advisable in order to provide the fluid resources required by the people for the proper financing of their industry. The framework of such an apex bank already exists in the presidency banks which might easily be made the medium or channel through which the fluid resources referred to, in the form of paper currency, would flow out to the people as required. Being issued only on the joint security of the people and under Government audit, the money would be certain to return. If the people have confidence in the paper, it is folly to keep the land derelict waiting for silver and gold. "A Bank," says Dunning Macleod, the standard authority on banking, "is not an institution for borrowing and lending money. It is a manufactory of credit," and it rests with Government to manufacture and issue in the form of paper currency whatever additional credit may be necessary to use up, in productive industry, the entire labour supply of India. The smaller the note the less silver will be required.

The gold standard reserve of £29,000,000 ought now to be made a base for a great addition to the paper currency. The war has shown it to be no longer required to keep exchange from falling below 1-4d. In the case of an adverse trade balance Government can pay the debt by paper in the form of three or six months bills on the basis of 1-4d for demand, and redeem the bills by the gold received when the trade balance turns and runs the other way as it does in nine years out of ten. The Home Government is paying for its American munition purchases, running into hundreds of millions sterling, with paper—the paper to be redeemed at leisure. India's small adverse balance comes round not oftener than once in ten years, and amounts to no more than ten millions sterling. Yet to meet this small bill no less than £29,000,000 of the money for which India is starving, is locked up in London. India gets the interest on a portion of this money, but she loses the principal. If the £29,000,000 were invested in irrigation, she would get the canals and wells and crops besides. Now she gets only the interest, while the London financiers get the principal. The Government of India should have charge of India's money. Control by the Secretary of State means control by London financiers who naturally study their own interests first and India's afterwards. In

this big gold reserve lies a powerful backing for India's paper currency and for the development of Indian industry.

One is loth to suggest revolutionary changes while the war is on, but if India is to go ahead in industry or anything else there must be revolutionary changes in the finances of both the Government and the people at the earliest possible moment. There is something extraordinarily far wrong with the finances of India when she cannot raise a few millions for public works which would remain a boon and a blessing to the country for all time, while Great Britain, with only a seventh of the population, can raise two thousand millions a year to blow away in shells. Even Australia, with only four or five millions of people, is at the present moment raising a war loan of £18,000,000 in addition to several others, while India with 320,000,000 of people can find practically nothing either for war or for peace. Some drastic changes are badly wanted, and I hope the Industrial Commission will not overlook the all important question of finance and its bearing on industrial development.

NOTE.—Sir D. M. Hamilton did not give oral evidence.

WITNESS No. 198.

HON'BLE MR. L. E. COBDEN RAMSAY, C.I.E., I.C.S., *Political Agent, Orissa Feudatory States, Sambalpur.* *Hon. Mr. L. E. Cobden Ramsay.*

The written evidence of this witness is confidential. He did not give oral evidence.

WITNESS No. 199.

MR. J. A. CRAVEN, *Dewan of Gangpur.*

Mr. J. A. Craven.

The written evidence of this witness is confidential. He did not give oral evidence.



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